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## SUMMARY OF RECENT ABSTRACTS*

### V. LEISHMANIASIS †

#### Visceral Leishmaniasis

*Epidemiology: Hosts: Transmission*

It is not generally known that leishmaniasis exists in Liguria, but Bulgarelli and Maranzana (p. 16) record 89 cases of visceral and 2 of cutaneous leishmaniasis which occurred there since 1925. All were autochthonous and most were in children; incidence was high in Genoa, and the disease was apparently moving northwards from southern Italy, though in recent years it has become less common. Izzo (p. 1301) reports on kala azar in children in Naples and Campania, Italy, where some 50 cases are seen each year. Transmission is probably effected by *Phlebotomus vesuvianus*. He has found treatment with potassium antimony tartrate successful if carried out for 4–5 months. For prevention he advocates fine bed nets and insecticides.

During the last 25 years kala azar has spread in Yugoslavia, where it is now endemic and occasionally epidemic. Todorović (p. 664) states that the reservoirs are man and dog and that dog infection is probably kept going by the zoophilic *P. perniciosus*. *P. major* is commonest in kala azar areas, and *P. sergenti* in oriental sore areas. Kala azar appears mostly in children aged 2–4 years, and then in older children and adults. Oriental sore occurs but is less common. Simitch and Zivkovitch (p. 665) also state that kala azar is now endemic in much of Yugoslavia, but they incriminate *P. major*, *P. perniciosus* var. *tobbi*, *P. chinensis*

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1957, v. 54. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on leishmaniasis in this series, see the June issue of the *Tropical Diseases Bulletin* each year since 1939.

var. *simici* and *P. perfiliewi* as probable vectors. Oriental sore is endemic in Dalmatia and Serbia, where the vector is *P. papatasi*. MINCULESCU *et al.* (p. 148) report on the first focus of infantile leishmaniasis to be found in Rumania, in the Craiova district which is adjacent to parts of Bulgaria where the disease is known to occur. 3 cases are described.

LUPAŞCU *et al.* (p. 1398) identified *P. perfiliewi* in an area of Rumania where kala azar is endemic. It was a wild species, common in natural habitats such as the burrows of *Citellus* and the nests of *Merops*, and was rare near human communities. *P. papatasi* was also present and was found in houses, in some of which there had been cases of kala azar.

VERMEIL (p. 17) collected records of 164 cases of kala azar reported in Tunisia since 1912. Oriental sore also occurs and cases have been numerous near Gafsa and Gabes. DOURY (p. 549) reports 2 cases of Mediterranean kala azar in children in the Hoggar region of Sahara, the first to be recorded from there.

It has long been suspected that there may be an animal reservoir of kala azar in the Sudan, but numerous workers have failed to find any. KIRK (p. 149) gives an account of his own work on donkeys, rodents, foxes (1 doubtful result in 4 examined) and dogs. Post-kala-azar leishmaniasis is found in the Sudan, and human carriers may therefore serve as the reservoir of infection.

An epidemic of kala azar occurred some years ago in the Kitui district of Kenya; MCKINNON and FENDALL (p. 17) now report on 40 cases recently found in the Baringo district, which is some 200 miles from Kitui. The patients were found in small groups near main stock routes in foothills at 3,000–4,000 feet, and there appears to be a steady increase in incidence. HEISCH (p. 1167) reports the finding of leishmaniae resembling *L. donovani* in a ground squirrel in a kala azar area of Kenya. Direct examination of these animals had always proved negative, but on this occasion the emulsified spleen was inoculated into a hamster, which became infected. The disease is presumably inapparent in these ground squirrels, as is not uncommon in primary vertebrate hosts of the zoonoses.

BHATTACHARYYA (p. 17) reports 140 cases of kala azar from the northern part of Assam, where a few years ago it was of little importance. The median age incidence was at 20–30 years, and Napier comments that formerly it was essentially a disease of children and adolescents.

The epidemiological importance of dogs as reservoir hosts of *L. donovani* is well known in the Mediterranean and Asian areas, but has not yet been elucidated in Brazil; DEANE and DEANE (pp. 274, 549) found infection in dogs in the State of Ceará, Brazil, and also in foxes, which, they suggest, may be reservoir hosts of the parasite. *Phlebotomus longipalpis* has been shown experimentally to be able to transmit *L. donovani*; DEANE and DEANE (p. 409) have now found natural infection in this sandfly, which is very common in the north of the State of Ceará, Brazil, and is therefore regarded as the principal vector there.

Important foci of kala azar along the Jaguaribe River in Brazil are reported by DE ALENCAR *et al.* (p. 1302), and these are associated with infection in dogs; the elimination of such dogs is advocated as a measure of control.

COLAS-BELCOUR and RAGEAU (p. 938) found *P. perniciosus* in the Allier Department of central France a matter of some interest because a case of canine leishmaniasis has also been recognized there.

Notes on the sandflies of the Poona district of India are given by MITRA (p. 238); they included *P. argentipes* which was found mostly in cattle sheds, which may indicate a preference for cattle.

### *Aetiology: Pathology: Clinical Findings: Treatment*

The amino acid composition of strains of *L. donovani* was investigated by BANERJEE *et al.* (p. 409).

From cytochemical studies on leptomonad forms of *L. donovani*, GUHA *et al.* (p. 409) conclude that certain granules observed are true mitochondria.

KIRK (p. 1365) discusses splenomegaly in kala azar, in which the defensive proliferation of reticulo-endothelial tissue is rendered invalid through the ability of the leishmaniae to invade and multiply within the reticulo-endothelial cells themselves. These cells rupture and the leishmaniae released invade other cells of the same formations, causing excessive production of reticulo-endothelial cells, whose bulk impairs the rhythmical muscular contractions of the normal spleen and leads to marked stasis of blood within the sinusoids. This leads to secondary hypersplenism, which is recognizable by the large number of macrophages, and which dominates the picture in the chronic disease; here leishmaniae are rare and specific therapy is often ineffective; splenectomy may be indicated.

SEN GUPTA *et al.* (p. 274) studied the liver in kala azar by various tests of liver function (mostly showing abnormalities) and by histological examination. Parasitized reticulo-endothelial cells are found in and around the portal tracts and also, with lymphocytes and plasma cells, in the liver substance as small granulomata; the neighbouring parenchyma cells usually show degenerative changes. Cirrhosis is not common in uncomplicated kala azar.

In the Calcutta area it has been considered that kala azar is indicated, rather than other forms of splenogemaly, if enlargement of liver and spleen are proportionate, but CHATTERJEE (p. 18) found that though the enlargement of the two organs is proportionate in the early stages of the disease, in the later stages the liver does not keep pace with the spleen. Disproportionate enlargement, therefore, does not necessarily rule out kala azar.

Serum globulin, and especially gamma globulin, is increased in kala azar; ARNAKI *et al.* (p. 799) show that the carbohydrate content of

gamma globulin is also increased, whereas that of alpha globulin is decreased, in this disease.

Pani (p. 1303) describes a modification of the Brahmachari test for kala azar, which consists in dropping 1–2 drops of serum into a small test tube containing distilled water. If the reaction is positive an obvious whitish cloud forms which sinks slowly and finally causes a general turbidity of the liquid. Comparison with other tests indicates that this is one of the most efficient, and it appears to be always positive in the acute phase of kala azar. Roy *et al.* (p. 19) used an antigen from *L. donovani* cultivated on the Ray solid medium in a complement-fixation test on 74 patients with post-kala-azar dermal leishmaniasis. 59% of the subjects gave a positive result; controls were negative.

In reporting a case of kala azar observed in Belgium, but with a history of residence in southern Italy, Dubois and Limbos (p. 408) stress the point that it is extremely important for physicians to know the geographical movements of patients and to have sufficient knowledge of tropical diseases to recognize the need for instituting the necessary investigations and treatment.

Manson-Bahr and Heisch (p. 938) describe the kala azar they have seen in the Kitui district of Kenya, where the patients were mostly adolescents. Fever was common, with enlarged spleen and lymphatic glands, anaemia and leucopenia (especially granulopenia). The aldehyde test was positive, parasites were found in spleen, liver, glands and bone-marrow, but never in blood. In a few patients small hyperpigmented areas with a central depigmented scar were found on the legs, and these may have been healed primary ulcers, or traumatic ulcers subsequently invaded by leishmaniae. The most effective treatment was with pentamidine isethionate followed by Pentostam.

In Israel Taub (p. 410) found that serum from newborn infants had a lytic action on flagellates of *L. tropica*, *L. donovani* and *L. infantum*. This property was thereafter rare in children up to the age of 5½ years but after that age it was common. The lytic principle is heat-labile but is unaffected by bilirubin or bile salts; it is probably a globulin. Although there was no correlation between age, the presence of the lytic principle, and incidence of infections with *L. donovani* and *L. tropica*, the author was struck by the correspondence between *L. infantum* infections and the absence of the lytic factor in children up to the age of 6 (except for the newborn).

Kirk (p. 1065) traces the history of the development and use of the aromatic diamidines in protozoan diseases, including leishmaniasis; he himself was one of the earliest workers to use them in kala azar. Rigg (p. 938) reports kala azar in a child aged 5 years, which resisted treatment with 4 courses of pentamidine isethionate; considerable improvement followed splenectomy.

Packchanian (p. 1164) reports encouraging results from the use of a new antimonial, Captostibone, in a few cases of [unspecified] leishmaniasis.

## Cutaneous Leishmaniasis

In England Clay and Ross (p. 148) report a case of cutaneous leishmaniasis in which the incubation period could not have been less than 10 years. They suggest that this long period may have been the result of living in a temperate climate.

Oriental sore is found throughout the year in a district of Persia on the Karcheh river, and is seen in children. The vectors are *P. papatasi* and *P. sergenti* and Gremliza (p. 666) suggests that dogs may be implicated. The people among whom the disease is found live in primitive and overcrowded conditions, and opportunities for the breeding of sandflies are abundant. He describes a technique for obtaining tissue for diagnosis from the margin of the sore. Neostibosan and Solustibosan were used intramuscularly, and Solustibosan by local infiltration, with success.

In a survey of the history of oriental sore in Iraq Pringle (p. 799) suggests that it is not a disease of great antiquity but arose by adaptation to man of a previously zoophilic strain of *L. tropica* by transmission through *P. sergenti*, which is highly anthropophilic. Later it was probably adapted to *P. papatasi* which carried it to the Mediterranean. In Iraq the disease is most common round Baghdad and its intensity is related to the intensity of *P. sergenti*. A dog reservoir is not likely, and man is probably the predominating reservoir animal. A lupoid type of disease, devoid of leishmaniae but spreading from the edges of healing oriental sores, is described; it is histologically identical with skin tuberculid.

Kellina (p. 551) accidentally infected her own eyelid while inoculating a mouse with a culture of *L. tropica*. The infection terminated by cicatrization in 8 months.

## American Leishmaniasis

Herrer (p. 1304) notes that in Peru cutaneous leishmaniasis (*uta*) was accurately described as early as 1764; the disease must be very old in that country.

10 cases of cutaneous leishmaniasis contracted in the Panama Canal Zone are reported by Langsjoen (p. 275); Fouadin was successful in treatment, but the course of therapy was prolonged.

Convit *et al.* (p. 1398) describe 3 cases of disseminated anergic American leishmaniasis, whose course is progressive and chronic, with occasional periods of exacerbation without affecting the general health. The type of leishmania is *L. braziliensis*, and there are enormous numbers in the lesions, which are described as erythematous macules, diffuse infiltrations, plaques, papules and nodules, usually on face, ears, elbows and knees.

Coutinho (p. 1305) reports a study of *L. enriettii*, which is pathogenic for guineapigs. When it is inoculated directly from a lesion into clean

guineapigs the infection is grave, but inoculation of leptomonad forms from culture produces a benign infection. Killed cultures injected as a vaccine affords some homologous protection, and animals born of infected mothers apparently have some resistance. *Charles Wilcocks*

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## MALARIA

*In this section abstracts are arranged as far as possible in the following order:*—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

East Africa High Commission. **Annual Report of the East African Institute of Malaria and Vector-Borne Diseases, July 1956–June 1957** [Wilson, D. Bagster, Director]. 26 pp., 3 figs. on 2 pls. 1957. Dar es Salaam: Govt. Printer. [Shs. 3/–.]

The fundamental and applied studies carried out in the Institute and in the closely related Pare Malaria Scheme relate mostly to *Anopheles gambiae*. M. T. Gillies reports on the use of adults marked with a number of different coloured paints, applied to the anopheline with a microloop before its liberation in a carefully mapped area in which recaptures are made. About 0·5% of some 13,000 females released have been recaptured and some preliminary conclusions are made on dispersal. Experiments have been made in the labelling of *Aëdes aegypti* with harmless radio-active material and their subsequent recognition by the preparation of autoradiographs. It has been found to be relatively easy to distinguish mosquitoes labelled with phosphorus-32 from those marked with sulphur-35, which may be a basis for distinguishing anophelines liberated on different dates and labelled with different materials.

M. G. Christie records studies of the effects of predators on the survival of larval *Anopheles gambiae* by an ingenious technique, and also a new technique for the recovery of anopheline eggs from an experimental pool which will make an experimental analysis of the oviposition habits of *A. gambiae* possible without restraining the females in any way.

A. Smith records the results of insecticide application on *A. gambiae* in the Pare scheme. Mortality in treated houses remained high, susceptibility to dieldrin (recorded by Armstrong) remained normal, the number of mosquitoes was greatly reduced and the sporozoite rate lessened from 0·3 to 0·03%. Studies on the feeding habits of the mosquito are recorded though the conclusions are not quite clear.

C. C. Draper records findings among the human population. Parasite and spleen rates as well as the infant parasite rate had substantially fallen at examinations made between 9 and 18 months after the first application of dieldrin spray. In three of the examples the infant parasite rate had fallen from high levels to 11, 9 and 3% while in a

fourth it had fallen from 38% to nil of 467. Findings on vital statistics are inconclusive, while clinical examination shows reduction in the frequency of enlargement of the liver, and of elevated temperature, and some improvement in haemoglobin values.

The other work mentioned or described includes the start of tests on the possibility of dieldrin toxicity hazard, studies on the susceptibility of the local anophelines to dieldrin, absorption of insecticides into walls, vapour toxicity of dieldrin, and the successful application of a granulated dieldrin from the air as a larvicide. G. MACLEAN gives an account of the frequency of schistosome infection and A. S. MSANGI gives a significant tabulated statement of snail findings in two coastal ponds over a period of two years. There is mention also, with some record of findings, of the Nandi Control Scheme in Kenya, the Zanzibar Control Scheme and some findings on malaria in Uganda. [For 1955–56 Report, see this *Bulletin*, 1957, v. 54, 1283.] *G. Macdonald*

SAUTET, J. Indice de régression et exophilie des anophèles dans le paludisme résiduel. [**The Index of Regression and Exophily of Anophelines in Residual Malaria**] *Méd. Trop.* Marseilles. 1957, Nov.–Dec., v. 17, No. 6, 836–42.

The author maintains that examples of the apparently spontaneous diminution of malaria are due to a decreased capacity of the parasite to produce gametocytes, which appears in malariometric measurements as a reduction in the gametocyte rate expressed as a percentage of the parasite rate. This, sometimes known as the gametogonic index, is described by the author as the index of regression. He claims that the prospect of continuation of an artificial regression of malaria stands in inverse ratio to this regression index and illustrates his point by citing examples where on previous surveys the index was low, medium or high and where the subsequent history of control has followed his expectations. He also considers that there is very little evidence in the literature of the actual eradication of malaria, which has more frequently been reduced to extremely low levels leaving some residual amount, the potential danger of which as a source of later epidemics is also in inverse proportions to the regression index either at the time or, presumably, during the original process of control. This residual malaria has drawn attention to the problem of exophily in anophelines which may cause the survival of malaria as an open air disease.

[The failure of production of gametocytes may represent an effect as well as possibly a cause of the prolonged cessation of transmission of the disease, and be independent of the inherent qualities of the parasite. Some readers would not accept the necessary equation of the persistence of a low spleen rate with the persistence of infection with malaria in the community.]

[See also this *Bulletin*, 1954, v. 51, 343.] *G. Macdonald*

Rehman, S. & Majid, A. **The Incidence and Control of Malaria in Army, Pakistan.** *Rev. Internat. Services de Santé des Armées.* Liège. 1958, Feb., v. 31, No. 2, 66–71, 1 chart.

Malaria is a well-acknowledged risk of armies both in peace and war and particularly in Pakistan, parts of which are highly malarious and where epidemics are frequent. The armed forces were re-formed in 1947 under peculiarly difficult conditions putting on them a greater strain than might be experienced in war. They responded by the creation of an organization which included a malaria training wing at the Army Centre, which recommended routine anti-malarial measures both personal and environmental, and which undertakes advisory functions, malaria surveys and such matters as the evaluation of insecticides, on the findings of which some notes are given. In the first year or so records could not be maintained but between 1949 and 1955 the incidence of malaria per 1,000 strength fell from 105·5 to 17·5. There was an increase to 34·1 per thousand in 1956 which was a year of general epidemic prevalence.

*G. Macdonald*

Griffith, D. H. S., Maurer, S. P. & Lim Swee Choo. **Further Studies on Malaria in Krian with a Note on Filariasis.** *Med. J. Malaya.* 1957, Sept., v. 12, No. 1, 348–72, 4 figs.

The authors continue their previous epidemiological exercise [this *Bulletin*, 1957, v. 54, 783] with a factual survey of malaria in the Krian district of North Perak in Malaya. Malaria, previously reputed to be virtually absent, but suspected in the authors' first survey, was demonstrated in the form of a 7% parasite rate [species unstated] and a 10% spleen rate. A number of specimens of *Anopheles barbirostris*, *A. hyrcanus nigerrimus*, *A. hyrcanus sinensis*, *A. lesteri* and *A. letifer* were dissected and both oöcysts and sporozoites were found in *A. barbirostris*, which is therefore considered incriminated as the carrier. This species was also found infected on 29 occasions with filarial larvae presumed to be those of *Wuchereria malayi*, a discovery which led to the finding of a previously unsuspected focus of filariasis, the details of which are given. The previous estimate of the frequency of malaria is taken to be substantially confirmed and the mechanisms of control are reviewed, it being concluded that it must be based very largely on treatment.

*G. Macdonald*

Wolcott, G. B., Young, M. D. & Ferguson, M. S. **On the Position of Malarial Parasites with relation to Erythrocytes.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, Jan., v. 52, No. 1, 87–90, 10 figs.

The authors have re-studied the position of the malarial parasite with regard to the host red cell in 8 species of plasmodia by means of phase-contrast microscopy. [Recent work on this subject has been reviewed in this *Bulletin*, 1956, v. 53, 840, 1210, 1211.] Studies were made in all

cases with living parasites in fresh blood: those studied were the three common malaria parasites as well as *P. knowlesi*, *P. berghei*, *P. relictum*, *P. lophurae* and *P. floridense* from lizards. Freehand sketches, still and motion photomicrography were used to illustrate the findings. Parasites observed under coverslips were frequently seen when escaping from their host cell without rupture of the erythrocyte, but mature parasites brought this about. The pseudopodia of the active *P. vivax* could be seen moving about in three dimensions but always within the confines of the red cell membrane. Good evidence for the presence of *P. relictum* within the red cells of pigeons was furnished by the displacement of the host cell nucleus. In summarizing the evidence for the intracellular position of the parasite the authors conclude " Careful study of ' appliqué ' forms appearing to be on the surface of erythrocytes indicates that they are artifacts ". *J. D. Fulton*

Jeffery, G. M. **Extended Low-Temperature Preservation of Human Malaria Parasites.** [Research Notes.] *J. Parasitology.* 1957, Aug., v. 43, No. 4, 488.

The author has extended his observations [see this *Bulletin*, 1956, v. 53, 709] on the viability of human malaria parasites, maintained for long periods at a temperature of about −70°C. Using blood forms, he obtained successful transmission after 2 years in three instances, after 1 year in 9 instances, and after half a year in 6 instances. The use of paired samples of blood containing *Plasmodium falciparum* or *P. ovale* showed that inoculation after a longer maintenance at −70°C. had little effect on the incubation period, indicating little loss of viability by the prolongation of storage. Experiments with *P. vivax* sporozoites gave similar results, and samples proved infective after 958 days of preservation.

[With the rapid development of malaria eradication, a " *Plasmodium* bank " is more than ever becoming a necessity and the methods described from South Carolina are being perfected in the nick of time.]

*P. C. C. Garnham*

Bray, R. S. ***Plasmodium ovale* in Liberia.** *Amer. J. Trop. Med. & Hyg.* 1957, Nov., v. 6, No. 6, 961–70, 1 fig. [19 refs.]

The incidence of *Plasmodium ovale* in Liberia is described in particular reference to the virtual absence of *P. vivax* [this *Bulletin*, 1950, v. 47, 428]. Three surveys were made, the first two at yearly intervals of 100 children aged 5–15 years in the Marshall territory, and the third of 434 persons of all ages in the Western Province; a few other areas were also investigated on a smaller scale. In Marshall territory the total parasite rate was 85%, with a *P. ovale* rate of 9% (as contrasted with a parasite rate of 87% and a *P. ovale* rate of 10% in children aged 1–4

years), while in the Western Province the parasite rate of the total population was 61% and the *P. ovale* rate was 4·4%. There was a seasonal rise in *P. ovale* from December to March, after the rains. In all, 94 infections of *P. ovale* were found during this investigation, but only a single undoubted case of *P. vivax* with typical morphological characters.

Diagnosis of *P. ovale* depends to some extent on the distortion produced in the erythrocyte by this species of parasite; the distortion is best elicited by quick drying, and in the moist atmosphere of Liberia this is difficult to ensure except by the use of a dehumidifying machine—then the typical oval and fimbriated appearance is easily demonstrable to the extent of 75% of infected erythrocytes. Four important criteria are used for diagnosing the parasite in its blood form: number of merozoites (mean number is 8, but considerable lability exists); Schüffner's dots, relative compactness of the trophozoite and, perhaps most important, the excessively large size of the nuclei of schizonts, which in stained, dry-fixed films are double the size of those of *P. vivax* and are usually oblong instead of spherical. In the oöcyst the cross-pigment formation is diagnostic of *P. ovale*. [The nature of pre-erythrocytic schizogony provides the best, though the least practicable, diagnostic criterion of this species.]

The author describes the blood stages of the parasite in some detail, including the course of the infection and the effect which it produces on the individual (rarely more than slight). He finally discusses the status of *P. vivax* in West African Negroes, and concludes that the low susceptibility of this race to the parasite, in the absence of a large reservoir population (in contrast to East Africa where there are many Indians) is the reason why *P. vivax* cannot maintain itself in the area which extends from the rain forest belt of the Gambia to the Cameroons, bordered by Mauretania in the north and Gaboon in the south, though the situation in the Congo is uncertain.

[See also this *Bulletin*, 1955, v. 52, 868, 869, 1046.]

*P. C. C. Garnham*

Frizzi, G., Angelillo, B. & Olia, P. Preliminari indagini citogenetiche su alcuni focolai larvali di *Anopheles maculipennis* della Provincia di Sassari. [**Preliminary Cytogenetic Studies on some Larval Breeding Places of *Anopheles maculipennis* in the Province of Sassari**] *Igiene Moderna*. 1957, July–Aug., v. 50, Nos. 7/8, 516–27. [16 refs.] English summary (6 lines).

The English summary appended to the paper is as follows:—

"The authors have carried out a field cytogenetic research in order to examine the anophelic fauna found in some larval breeding places in Sardinia (Sassari).

"They have observed an initial polymorphism in the slight population of the Castelsardo breeding place. Consequently, they discuss its value and the possible developments of future studies."

Sautet, J. Exophilie et migrations chez les anophèles, en particulier chez *Anopheles gambiae*. [**Exophily and Migration in Anophelines, with Special Reference to** *Anopheles gambiae*] *Bull. World Health Organization*. Geneva. 1957, v. 17, No. 3, 367–76. [50 refs.]

The English summary appended to the paper is as follows:—

"Investigation of possible methods of malaria eradication has aroused new interest in the exophily of anophelines formerly regarded as anthropophilic and endophilic.

"The author points out that this problem had been studied long before the introduction of malaria control by means of residual insecticides. In particular, he gives an account of his own work. In Corsica, as early as 1937, he reported the presence of exophilic groups among *A. maculipennis labranchiae* and *A. sacharovi* populations in natural breeding-places far from dwellings. In Lebanon, he found *A. sacharovi*, *A. sergenti* and *A. superpictus* in holes in walls and in the fields. In the Sudan, *A. gambiae* has been shown to be exophilic and the possibility of 'open-air malaria' has been confirmed; this characteristic has been further noted, with the same mosquito, in Mauritania. The author concludes that, if carefully sought, exophily may be found in mosquito populations of all areas; that it is accompanied by anthropophily; and that it may play a by no means negligible role in the maintenance of residual malaria.

"He considers the possibility that the use of insecticides may influence the migration of anophelines and points out the necessity for thorough and long-term research on this question. In conclusion, he stresses that in any study of mosquito behaviour under insecticidal control, the anopheline breeding- and resting-place should be investigated before disinsectization and over an area considerably wider than that actually under treatment; that the investigations should cover a period of several years; and that the first step in such a study should be detailed and far-ranging bibliographical research; it is only thus that the question of modification of anopheline behaviour under the influence of insecticides can really be elucidated."

Raffaele, G. & Carrescia, P. M. Effetto di dosi uniche di chloroquine e pyrimethamine associate. [**Effect of a Single Dose of Chloroquine and Pyrimethamine in Combination**] *Riv. di Malariologia*. 1957, Dec., v. 36, Nos. 4/6, 227–31, 4 graphs on 2 folding pls. English summary.

This paper is based upon the results of treatment in patients with neurosyphilis undergoing malaria therapy in Rome. The standard treatment consisted of a single dose of 600 mgm. of chloroquine associated with 50 mgm. of pyrimethamine. 11 patients were inoculated, 9 with *Plasmodium vivax* (3 of them with sporozoites) and 2 with *P. malariae*. In the former fever had disappeared in 24 hours and the parasites in 36.

It is surprising to note that in *P. malariae* infections fever and parasites disappeared with the same rapidity. No relapses were noted during 30–60 days of observation.

*Anopheles maculipennis atroparvus* were fed on 4 of the patients inoculated with *P. vivax* before administration of the drugs and also after. There appears to have been considerable protection as mosquitoes fed on one patient only became infected with oöcysts after treatment, although mosquitoes fed on all 4 patients had become infected before treatment.

[See also this *Bulletin*, 1954, v. 51, 530.] *Philip Manson-Bahr*

Clyde, D. F., Webbe, G. & Shute, G. T. **Single Dose Pyrimethamine Treatment of Africans during a Malaria Epidemic in Tanganyika.** *East African Med. J.* 1958, Jan., v. 35, No. 1, 23–9.

A malaria epidemic broke out in December 1953 among labourers employed on a tea estate in Tanganyika, 2 miles north of Amani, in the Usambara mountains, at an altitude of 3,000 ft. In February 1954 the parasite rate was 85%. The predominant *Plasmodium* was *P. falciparum* (80%), the rates for *P. malariae*, *P. vivax* and *P. ovale* being 8, 5 and 3%, respectively. The sporozoite rate in *Anopheles funestus* during the first week of the survey was 9·6%, an unusually high figure for this species.

Single dose mass treatment with pyrimethamine was administered to 329 Africans at the following dosage:—age 1–5 years, 25 mgm.; 6–10 years, 50 mgm.; 11–15 years, 75 mgm.; 16 years and over, 100 mgm. Six days later the parasite rate had fallen to 3% (*P. malariae* 1 case, *P. falciparum* 4) of 156 persons re-examined.

107 labourers received a second dose of pyrimethamine one month after the first, but again not all were cleared of parasites in the peripheral circulation. Case histories are given of 3 persons, each of whom received 3 spaced doses of the drug. In one patient parasites were eliminated after the third dose, while in the remaining 2 parasitaemia (*P. falciparum*) persisted. The authors state, however, that because of the incomplete follow-up, it cannot be assumed with certainty that these parasites were resistant to the drug. [See this *Bulletin*, 1958, v. 55, 482.] *G. Covell*

World Health Organization. Technical Report Ser. No. 132. **Malaria Conference for the Eastern Mediterranean and European Regions, Athens, Greece, 11–19 June 1956. Report.** 47 pp. 1957. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [3s. 6d.; $0.60; Sw.fr.2.–.]

The Conference or its associated Advisory Meeting on Malaria Eradication was attended by representatives of most countries of the Mediterranean lands and of the Near East as far as Pakistan; it was also

attended by a number of consultants, including the members of the Expert Committee on Malaria which subsequently met, and the material here collected was considered alongside comparable matter from other parts of the world in the preparation of its Sixth Report [this *Bulletin*, 1958, v. 55, 248].

There are in the countries involved some 170 million people of whom not less than 100 million live in potentially malarious areas, in most of which malaria control schemes of one sort or another are established. Eradication has been achieved in Italy including Sardinia and Sicily, Corsica, Crete and Cyprus, while programmes which are on the way to achieving eradication exist in Albania, Bulgaria, Portugal, Spain, Rumania, Yugoslavia and in Greece where, however, success has been impeded by anopheline resistance to insecticides. This is thought to be the only major obstacle to success though there are many lesser difficulties, including for instance transmission by firmly exophilic (or "elusive") mosquitoes such as *Anopheles sergenti*, and the perpetuation of the reservoir of the disease in nomadic people who constitute a large part of the population of the more eastern regions. Success may turn also on the proper organization of schemes, their integration into the general public health system of the country concerned, and the coordination of campaigns across national boundaries. All of these subjects are reviewed and in each case with the production of balanced conclusions on methods of approach to them.

The report includes a tabular statement of the population living in malarious areas and the numbers of them protected, together with the forms of protection used, statements on the recording of malaria statistics, and finally a report on the Advisory Meeting on Malaria Eradication in the more eastern territories which were considered separately from those of the Mediterranean countries. *G. Macdonald*

Kuhlow, F. Experimentelle Untersuchungen über Resistenz von Anophelen gegenüber DDT und Dieldrin. [**Experimental Studies on Resistance of Anophelines to DDT and Dieldrin**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, No. 4, 532–8.

Attempts were made to raise resistance of laboratory colonies of mosquitoes to dieldrin or DDT, by exposing larvae or adults to partially lethal concentrations and breeding from survivors. The tests with DDT were done on the larval stage. Selection by doses giving LD50 produced no sustained increase in resistance, even after selection for 6 generations (*Anopheles stephensi*) or 10 generations (*A. m. atroparvus*).

The tests with dieldrin were handicapped by the delayed action which prevented reproduction in *A. stephensi* in the survivors from doses only partly lethal within 24 or 48 hours. With *A. m. atroparvus*, selection of adults by dieldrin for 3 generations gave no increased resistance.

It was concluded that the small inbred laboratory colonies used did not

contain genetic material capable of developing resistance to the insecticides used.

[See also Davidson, this *Bulletin*, 1957, v. 54, 124 *bis*.]

*J. R. Busvine*

Patel, T. B., Ramachandra Rao, T. & Paranjpey, P. D. **A Pilot Study on the Suspension of D.D.T. Spraying and the setting up of a Surveillance Organisation in Kanara District covering the Work up to October 31, 1956.** *Indian J. Malariology.* 1957, Sept., v. 11, No. 3, 271–92.

Kanara, a district of Bombay, is the site of one of the first two schemes of systematic and continued control of malaria by DDT in India. The disease was moderately intense and transmitted by *Anopheles fluviatilis*, which was discoverable both in and out of doors in reasonable numbers, showed a high sporozoite rate and transmitted malaria at all seasons of the year. Malaria control involved the application of 56 mgm. of DDT a square foot of wall surface in houses, and later in cattle sheds, at intervals of 8 weeks during the malaria transmission season, at first in the form of an emulsion which was later replaced by a suspension. In 10 years' practice the malariometric indices were reduced to zero and the anopheline carrier, *A. fluviatilis*, became extremely rare, being only discoverable on special search and in isolated places.

In 1956 insecticide application was discontinued and an experimental surveillance system, intended to test both mechanisms and the capability of staff, was substituted. It involved, among other things, a fortnightly house-to-house visit, with the preparation of blood smears from persons with fever, and routine searches for adult and larval mosquitoes. In 5 months' practice covering the previous peak period of malaria there was no increased prevalence of fever, one of 1,500 blood films was found to be positive and was reasonably attributed to a relapsing *P. malariae* infection, and no specimens of *A. fluviatilis* either adult or larval were discovered. Moreover, the mechanics of surveillance worked well and it was concluded that one inspector could supervise about 10,000 people on a fortnightly examination mechanism, though it is suggested that the intervals might be increased in future to 4 weeks. The reasons for the apparent disappearance of *A. fluviatilis* are discussed in a conservative manner, it being concluded that suggestions of eradication must await a further period of search.

The primary objectives of the experiment, which were to test the mechanisms of surveillance for wider use in India, were very adequately met.

*G. Macdonald*

Edeson, J. F. B., Wharton, R. H., Wilson, T. & Reid, J. A. **An Experiment in the Control of Rural Malaria in Malaya.** *Med. J. Malaya.* 1957, Sept., v. 12, No. 1, 319–47, 9 figs. [18 refs.]

The experiment, carried out from 1948–1952, but previously only reported in mimeograph, included a preliminary survey in 4 adjacent valleys of Negri Sembilan State and the subsequent application of control measures in 3 while the fourth was left untouched. In 2 valleys residual insecticides were applied to the houses; in 1, with a population of 1,370, DDT was applied at 200 mgm. per square foot; in the other, with a population of 475, BHC was used at a dose of 40 mgm. of the gamma isomer per square foot. Both of these insecticides were at first given at 3-month intervals and later at 6-month intervals. In the third valley, where there were 1,300 people, 0·1 gm. of proguanil was given each week to all the people except the infants. These control measures were continued for 3 years after a preliminary 7 months' observation.

The original incidence of malaria was, by general standards, low in all areas, so that in the comparison area 1 person in 10 might become infected annually while in the treated areas about 1 person in 5 might be infected each year. The carrier is *Anopheles maculatus*, which is recognized to rest normally outdoors and may thereby possibly evade frequent contact with treated surfaces. In none of the areas was complete control gained; the most convincing of several sets of figures shows that 8% of infants in the DDT area became infected during the 3 years of observation, 10% of those in the BHC area, 7% of those in the proguanil area and 26% of those in the comparison area. Various intermediate checks were carried out which showed, among other things, that the efficacy of BHC treatment decreased very considerably within the 6-month period during the last 6 weeks of which it only caused a mortality of 26% of the mosquitoes actually entering treated houses. No beneficial effect of the partial control of malaria on the population was noted.

The authors conclude that there was a great reduction in malaria but that neither insecticide nor drug alone can completely interrupt transmission and that malaria control by either must be a continuous process. They consider, however, that there might perhaps be some advantage in the combination of mass treatment, not prophylaxis, with insecticide application. [Two of the treatments given were, admittedly, defective. Proguanil was not given to infants and the dose was quite inadequate for any except small children. The BHC application was quite ineffective for quite a considerable part of the 6 months' period. There are no data on the efficacy of the DDT except that it appeared to irritate the mosquitoes, the relationship between crystal size, irritation and kill not being understood at that time, and so not being specially investigated.]

*G. Macdonald*

DE ROOK, H. **Control of Malaria in Sorong (Netherlands New Guinea).** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, Dec., v. 9, No. 4, 341–4.

Sorong is a newly established oil settlement in the wet coastal regions of New Guinea, much of the area concerned being under high-tide level

and influenced by mosquito breeding in lagoons and mangrove swamps. When it was first established in 1947 there was considerable malaria due to *Plasmodium falciparum* transmitted by *Anopheles farauti* and *A. punctulatus*, breeding very widely, the former in clear open pools and brackish water and the latter particularly in ruts from bulldozers, holding turbid, yellow-coloured, clayish water without vegetation. Malaria control has been exclusively by the prevention of mosquito breeding both by filling and draining of swamps and by the application of larvicide for which exclusive reliance is placed on oil, about 50 tons of which are used per month to protect the 7,500 inhabitants. Good control is secured, the vector mosquitoes are relatively rare, nuisance mosquitoes are considerably reduced and the incidence of malaria has fallen in the 10 years of control from 27 to 0·3% of employees. Most of the cases occurring are thought to be relapses from infections acquired elsewhere, though the corresponding infant parasite rate of 0·4% would appear to confirm the local infection. [The degree of success seems very gratifying but the techniques would be beyond the financial means of most other concerns.]

*G. Macdonald*

Bano, L. **Partial Inhibitory Effect of *Plistophora culicis* on the Sporogonic Cycle of *Plasmodium cynomolgi* in *Anopheles stephensi*.** [Correspondence.] *Nature*. 1958, Feb. 8, v. 181, 430.

Daily dissections of 3 batches of *Anopheles stephensi*, which had been fed on a rhesus monkey infected with *Plasmodium cynomolgi*, revealed poor infections in 2 batches. Nearly 50% of the mosquitoes in one of these batches had moderate infections of a microsporidian, *Plistophora culicis* and the other had approximately 100% heavy infections of the microsporidian. The third batch showed good infections of the Plasmodium with only about 5% light infections of *Plistophora*.

This partial inhibitory effect of *Plistophora culicis* is reflected in small numbers, retarded growth and degeneration of oöcysts and oöcyst infection rates between 10 and 20%, and may be caused by scarcity of nutrient, inability of the oökinetes to penetrate the stomach wall because of the covering of *Plistophora*, and by infection of the Malpighian tubules leading to deposition of toxic substances.

*H. S. Leeson*

Adler, S. [**The Suppressive Effect of a Meat Diet on Infections of *Plasmodium vinckei* in Mice**] *Harefuah*. Jerusalem. 1958, Feb. 2, v. 54, No. 3, [in Hebrew 63. English summary 63–4].

The English summary appended to the paper is as follows:—

" The strain of *P. vinckei* maintained in our laboratory causes a typical acute infection and a 100% mortality in white mice maintained on the stock diet of the University animal house. Out of 47 mice restricted to

a diet of meat (fresh beef in 40 mice, boiled beef in 7 mice) and water and infected with *P. vinckei* only 3 died as a result of the infection. Of 8 splenectomised mice infected with *P. vinckei* and maintained on a meat diet, only one died of the infection.

"These results are similar to those of Maegraith et al. (1952) who found suppression of *P. berghei* in rats restricted to a milk diet. Hawking (1954) showed that the addition of PABA to the milk abolishes the suppressive effect of a milk diet on *P. berghei* in rats. In our experiments daily intraperitoneal injections of 2 γ PABA in mice completely abolished the suppressive action of the meat diet and restored the mortality from *P. vinckei* to 100%; in splenectomised mice the suppressive action was abolished by daily intraperitoneal injections of 0·5 to 1 γ PABA.

"It is interesting to note that mice (non-infected as well as those recovered from an infection of *P. vinckei*) maintained on a meat diet eventually develop a severe anaemia (after 4 to 8 weeks) in which the red count eventually falls to 2 million or less. In its terminal stages this anaemia is characterised by a very striking anisocytosis. Untreated cases are almost always fatal. Advanced stages of the anaemia can be cured by placing the animals on a liver diet. The initial addition of liver to the meat (1 part liver to three parts meat) prevents the anaemia."

Ball, G. H. & Chao, J. **Development *in vitro* of Isolated Oocysts of *Plasmodium relictum*.** *J. Parasitology.* 1957, Aug., v. 43, No. 4, 409–12. [10 refs.]

Persistent attempts by the senior author over the last 10 years to grow oöcysts of *Plasmodium in vitro* [this *Bulletin*, 1954, v. 51, 1229] have at last met with partial success. Using *Plasmodium relictum* in *Culex tarsalis*, the present workers detached, under sterile precautions, oöcysts from the stomach wall and suspended them on fragments of cover-slips in sealed hanging drops or Carrel flasks, aerated in a mixture of 5% $CO_2$ and 95% air. The cultures were rocked at a frequency of 7 times a minute and immersed in various types of medium of which the most successful contained chicken serum and embryo extract. By changing the medium every 1 or 2 days growth of the oöcyst to three times the original size was made possible after 5 to 8 days' cultivation, but sporozoites never developed, even when a portion of stomach wall was included in the culture.

[See also Weathersby, this *Bulletin*, 1955, v. 52, 612.]

*P. C. C. Garnham*

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## TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:— epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Neujean, G. & Evens, F. Diagnostic et traitement de la maladie du sommeil à *T. gambiense*. Bilan de dix ans d'activité du centre de traitement de Léopoldville. [**Diagnosis and Treatment of** *Trypanosoma gambiense* **Sleeping Sickness. Account of 10 Years Activity at the Treatment Centre in Léopoldville, Belgian Congo**] *Acad. Roy. des Sci. Coloniales. Classe des Sci. Naturelles et Méd. Mémoires in-8°.* (n.s.) 1958, v. 7, No. 2, 175 pp., 1 graph, 2 figs. on 2 pls. & 2 folding maps.

Work on sleeping sickness (*Trypanosoma gambiense*) has been continuous for more than 50 years at Léopoldville, Belgian Congo. Such names as Broden, Rodhain, van den Branden and van Hoof testify to its quality. The authors of this monograph continue to sustain a great tradition. Their immediate concern is an examination of progress in the diagnosis and treatment of the disease during the decade prior to 1954. This was a period when new drugs were being introduced but were bringing fresh problems in their train. During this period, a combination of prophylactic chemotherapy and of attack on the insect vectors greatly reduced the incidence of sleeping sickness. But some patients have suffered adversely as a result of the chemotherapy. It therefore is opportune to assess the position today.

The problem of trypanosomiasis in the Congo now is the diagnosis and radical cure of the individual patient rather than, as in the past, control of the infection in the community primarily to prevent its spread. The diagnosis of sleeping sickness and determination of the stage reached by the disease are essentially matters of laboratory investigation. In the first, or haemo-lymph, stage of the disease gland puncture and repeated blood examination—best done in the form of fresh wet preparations and, where practicable, after triple centrifugation—are still the basic procedures of diagnosis. Blood culture can be of value, especially in previously treated patients. Marrow puncture, scarification of the skin, animal inoculations and xenodiagnosis are all inferior to the first two simple methods. Collateral examinations which assist in diagnosis of the disease during its first stage, though they are not specifically diagnostic, include the adhesion phenomenon, the formol-gel test, and the complement-fixation test. The last of these, which obviously needs special facilities, is useful in following the evolution of the disease.

When the central nervous system is invaded, lumbar puncture and examination of the cerebrospinal fluid for cells and protein give indispensable information. The study of the fluid must be made within a

couple of hours of its withdrawal, or conclusions based on it may be misleading. It is well to remember that progress of the disease from the first (haemo-lymph) into the later (sleeping sickness) stage is not sharp and sudden, but is gradual and progressive. In the advanced second stage detailed neurological investigations, including pneumo-encephalography and examinations both of cephalic and of spinal fluid, yield information of much value. Parasites can be found in the cephalic fluid some time before they appear in the spinal fluid; they may be present in either quite early in the disease before the cell counts become abnormal. Most thorough investigation is therefore necessary before it can be claimed that the disease has not passed beyond the early stage of haemo-lymph infection, for which comparatively simple and innocuous forms of treatment suffice.

A dominant factor in treatment has been the development and extension of tryparsamide resistance. Two valuable new trypanocides, pentamidine and Arsobal (Mel B, Friedheim), have been used widely in the treatment of sleeping sickness. In an endeavour to determine their values 743 previously untreated patients in various stages of the disease have been treated solely with one or other of 4 drugs—Antrypol (Bayer 205), pentamidine (Lomidine), tryparsamide, or Arsobal—with due consideration of the stage of the disease in each patient. On this assessment pentamidine has proved markedly superior to Antrypol during the first stage of the disease; after the central nervous system is involved Arsobal, although more toxic, gives a much higher cure rate than does tryparsamide. In the treatment of relapse, after employment of another drug, Arsobal is invaluable. After unsuccessful initial treatment with Arsobal this drug is much less effective and the outlook therefore is bad; but, surprisingly, tryparsamide may effect a cure in such a case.

Of other methods of treatment tried, melarsen oxide, though effective, was less easily handled than was Arsobal; combined pentamidine and tryparsamide therapy gave good therapeutic results, but it was dangerous as it may cause blindness or sudden death—its use therefore should be abandoned. Antrypol given with pentamidine lessens the toxicity of the latter and is very effective; this is therefore the treatment of choice before the central nervous system is invaded. BAL should not be given during or after arsenical treatment as it may neutralize its effect; the use of BAL should be reserved for such mishaps as optical changes during tryparsamide, or arsenical encephalitis during Arsobal, treatment.

What constitutes cure is difficult of assessment; the passage of time is all-important in determining it. An apparent restoration to normal on all examinations may be followed by relapse, with the reappearance of parasites. On the other hand, certain abnormalities, such as a raised albumin content in the spinal fluid, may remain, without reason to believe that the parasitic infection persists. It is after pentamidine treatment that this difficulty in assessment particularly arises; relapse after treatment with the other drugs is fairly readily detected. Regular re-examinations

of blood and of gland juice normally should reveal relapse of early first stage cases of the disease; but sometimes insidious involvement of the central nervous system, possibly with the appearance of parasites in the spinal fluid but not elsewhere, may be its first indication. A return to normal of the cell content, and following this a return to normal of the biochemistry, of the spinal fluid, and its maintenance within physiological limits, is the best indication of cure. While the fluid cell count continues steadily to progress towards normality no further treatment is necessary or advisable.

These and many other matters of interest and of practical importance emerge from a study of this excellent monograph. It is written clearly and concisely and it is worthy of the closest study by those concerned with its subject-matter. *A. R. D. Adams*

WILLETT, K. C. & GORDON, R. M. **Studies on the Deposition, Migration, and Development to the Blood Forms of Trypanosomes belonging to the *Trypanosoma brucei* Group. II.—An Account of the Migration of the Trypanosomes from the Site of their Deposition in the Rodent Host to their Appearance in the General Circulation, with some Observations on their Probable Routes of Migration in the Human Host.** *Ann. Trop. Med. & Parasit.* 1957, Dec., v. 51, No. 4, 471–92. [14 refs.]

The authors trace the migration of trypanosomes during the incubation period, *i.e.*, from the time of injection by the tsetse fly to the first detection of trypanosomes by microscopic examination of the blood. Previous work [GORDON *et al.*, 1957, v. 54, 544] suggested that when the infected fly bites, some trypanosomes are deposited in the tissues, others entering the circulation directly.

Each of a series of 10 guineapigs, infected with *Trypanosoma brucei* by the bite of a fly, was killed daily up to the end of the incubation period. The site of injection was found positive (either by direct examination or by subinoculation) in animals killed on days 4–7, whereas the blood had been shown positive already since day 3. These and other experiments with rats and rabbits inoculated locally with blood forms showed (in spite of the marked tendency of rabbits to local reaction) that blood infections developed concurrently with, or before, development at the local site.

Earlier experiments (WILLETT and GORDON, *Trans. Roy. Soc. Trop. Med. & Hyg.*, 1957, v. 51, 3) had shown that trypanosomes (*T. rhodesiense*) were apparently absent from the local site from the time that the fly had withdrawn its proboscis until days 3–4. The local site and other organs were therefore excised and tested by subinoculation of macerated tissue in a series of guineapigs killed in rapid succession after the bite of the infected fly. The blood was positive at 5 minutes, 45 minutes and 1½ hours, and negative at 3 hours and thereafter; the site of the bite was

negative at 5 minutes, positive at 20 minutes and 45 minutes, negative at 1½ hours and thereafter; the lymph glands draining the area were positive (intermittently) at 45 minutes and 6 hours. Although stained slides from the local site showed no organisms, these successful subinoculations, obtained throughout the incubation period, indicated clearly the improbability of there being a cryptic cycle of development and this was further clarified by the injection of metacyclic *T. rhodesiense* directly into the blood stream of a rabbit, and their successful recovery by subinoculation in each of 13 attempts from 5 minutes after inoculation until the end of the incubation period at day 4.

The chancres of rabbits produced by the bite of infected flies were examined. Local multiplication of trypanosomes was considerable, rising in one instance to nearly 2 million per cmm. In most instances the blood was already positive on subinoculation before trypanosomes appeared in the chancre but this did not occur after the flies had bitten several times and had discharged, presumably, most of their metacyclic trypanosomes.

Finally, an attempt was made to reduplicate these results in a human volunteer, but no clear-cut result was achieved.

[The main conclusion to be drawn from this work is that the local infection does not necessarily precede the development of blood infection; however, the massive development of trypanosomes in a chancre may in fact contribute to the initial rise in the number of trypanosomes in the blood at the end of the incubation period.] *W. E. Ormerod*

Fromentin, Huguette. Étude expérimentale de l'action de quelques trypanocides usuels. [**Experiments with established Trypanocidal Agents**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 758–69, 2 figs.

The author has employed the method of Yorke *et al.* for keeping trypanosomes alive *in vitro* at 37°C. [this *Bulletin*, 1930, v. 27, 237] while measuring the trypanocidal activity of certain drugs. A study of substances which could aid penetration of the cerebrospinal fluid by drugs was also made. For this purpose 228 mice were used. The medium for maintenance of trypanosomes consisted of 1 part fresh rabbit serum plus 2 parts normal saline with 1·0% glucose. The drugs used were tryparsamide, reduced tryparsamide, Mel B (melaminyl-4-phenyl-arsenodithioglycerol), MSb (*para*-melaminyl phenyl stibonic acid), a complex urea derivative, pentamidine and Berenil (di-4-amidino phenyl-triazene-N 1:3-diaceturate). Their effect *in vivo* and *in vitro* on *T. rhodesiense* was compared.

The presence of trypanocidal agents in nervous tissue of treated mice was investigated by making extracts of minced brain tissue. The trypanocidal activity of sera from normal and infected mice after drug treatment was also compared. Three substances, namely acetazolamide (Diamox),

dextran and hyaluronidase were given just before the drugs in the hope that they would assist the drugs in reaching the cerebrospinal fluid.

The titres of the mouse sera after infection with the various drugs are shown in a table and the rate of excretion in serum of certain drugs in graphs. The fact that titres of the sera of mice infected with *T. rhodesiense* and treated with various trypanocides were higher than those of normal mice similarly treated was thought to be due to a combination of trypanosome protein and drug, which was excreted slowly, rather than to antibody formation. The results with extracts of brain suspensions were not encouraging in spite of the concomitant use of the 3 substances indicated. *J. D. Fulton*

WILLIAMSON, J.; DESOWITZ, R. S. **Suramin Complexes. I.—Prophylactic Activity against *Trypanosoma congolense* in Small Animals** [WILLIAMSON]. *Ann. Trop. Med. & Parasit.* 1957, Dec., v. 51, No. 4, 440–56, 4 figs. & 2 pls. [44 refs.] **II.—Prophylactic Activity against *Trypanosoma vivax* in Cattle** [DESOWITZ]. *Ibid.*, 457–63.

These two papers give an account of the chemical principles involved in the use of suramin complexes to enhance the prophylactic effect of trypanocidal drugs against *Trypanosoma congolense* and of their effect in laboratory animals and in cattle. The first paper contains much valuable historical and chemical detail on the use of suramin complexes to which the reader is referred; this is relevant to human medicine only in so far as many of the findings are probably also applicable to suramin-pentamidine complexes studied previously by GUIMARAES and LOURIE [this *Bulletin*, 1952, v. 49, 126].

The second paper shows the prophylactic effect of several of these complexes in cattle. With one of these complexes (Ethidium-suramin) prophylaxis of 1–2 years was obtained. Many of the toxic effects of the drugs given without suramin were lessened or abolished when it was added but local reactions were in general severe and one beast which had died after receiving the Antrycide-suramin complex showed extensive kidney lesions. *W. E. Ormerod*

LINCICOME, D. R. **Growth of *Trypanosoma lewisi* in the Heterologous Mouse Host.** *Exper. Parasit.* New York. 1958, Jan., v. 7, No. 1, 1–13, 2 figs. [33 refs.]

"*Trypanosoma lewisi* from the rat (homologous) host may be induced to grow abundantly in the mouse (heterologous) host by an homologous serum supplement to the mouse. The trypanosomes are found only about 24 hours after inoculation in the normal, healthy mouse, and up to a week or more in such mice that have been supplied with serum intraperitoneally. Restriction of the mouse's diet and a supplement of rat

serum combine to favor luxurious growth of the parasite. The action of serum may be wholly protective, or that of a blocking agent for the reticuloendothelial system, or it may be metabolic providing the trypanosome with necessary nutritional elements unavailable in heterologous hosts.''

DE CARVALHO, A. G. & BARBOSA, J. A. Zoogeografia de Triatominae neotropicais (Hemiptera, Reduviidae). [**Zoogeography of Neotropical Triatominae (Hemiptera, Reduviidae)**] *Rev. Goiana Med.* 1957, July–Aug.–Sept., v. 3, No. 3, 181–96. [123 refs.]

The English summary appended to the paper is as follows:—

''The authors study the triatomid zoogeography, in the Neotropical region, and point out the species found infected by *S. cruzi*. They show their distribution by countries, and in the particular case of Brazil, by states.

''They do not distinguish between domestic and wild species, since they think both have or will have epidemiologic significance.''

ABALOS, J. W. Importancia epidemiológica del *Triatoma infestans* en Argentina. [**Epidemiological Importance of *Triatoma infestans* in Argentina**] *Bol. Oficina Sanitaria Panamericana.* 1958, Jan., v. 44, No. 1, 37–40, 3 figs.

Seventeen species of triatomid bugs are recorded from Argentina—11 species of *Triatoma* (including *T. infestans*), 2 of *Neotriatoma*, 3 of *Panstrongylus* (including *P. megistus*) and *Psammolestes coreodes*. 3 of the 17 species are rare, 10 are wild (including *P. megistus*), 3 are peridomestic in habit (*T. sordida*, *T. guasayana* and *T. patagonica*) in stockyards, pigeon lofts, rabbit huts, etc.; only occasional specimens of them occur in houses.

*T. infestans*, because of its habits, is the only vector of *S. cruzi* to man in Argentina, and up to 80% of the bugs may harbour the parasite. An account, with photographic illustrations, is given of the habits of the bug, which is commonly found in large numbers in the cracked walls and thatch roofs, and also in furniture which is seldom moved, of poorly constructed rural and suburban dwellings. It is in these conditions that Chagas's disease occurs in man. Various types of fowl and domestic animal shelters are also infested. Treatment by residual spray of walls and roofs with benzene hexachloride at 500 mgm. per square metre [? 500 mgm. gamma-isomer] in about 1,000 houses in one part of Tucumán province resulted in eradication of the bugs; none were found as long as 500 days after the treatment. Such treatment, combined with education in domestic hygiene, on a national scale is suggested as a practical proposition for the control of the bugs and Chagas's disease in Argentina. *D. S. Bertram*

Koeberle, F. Patogenia da moléstia de Chagas. Estudo dos órgãos musculares ôcos. [**Pathogeny of Chagas's Disease**] *Rev. Goiana Med.* 1957, July–Aug.–Sept., v. 3, No. 3, 155–80, 11 figs. [42 refs.]

The English summary appended to the paper is as follows:—

"The author describes the pathogeny of the Chagas disease, pointing out the lesions of the cells of the autonomic nervous system by neurotropic toxins liberated by the leishmania forms of the *Trypanosoma cruzi*.

"The author believes that those lesions are the only ones responsible for the clinical features and pathological anatomy of the disease. The pathogeny of the disease is explained by studies carried out in the hollow viscera of men and animals with Chagas disease and laboratory animals in which the T. cruzi was inoculated.

"The most impressive manifestation of Chagas disease in the hollow viscera is the *entcromegaly*, which means the hypertrophy and enlargement of different segments of the digestive tract, as well as biliary ducts, trachea, bronchi and genito-urinary tract.

"According to the author, the acute phase dictates the outcome of the disease and the efficacy of the treatment.

"He feels that the best treatment should be the administration of antitoxin and some kind of specific agent against the Trypanosoma. The vaccination with anatoxin, as for diphtheria, should be tried, as prophylactic measure, while we have to wait for the total eradication of the Triatoma."

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## LEISHMANIASIS

*In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.*

i. Floch, H. Épidémiologie de la leishmaniose forestière américaine en Guyane française. [**Epidemiology of American Forest Leishmaniasis in French Guiana**] *Riv. di Malariologia.* 1957, Dec., v. 36, Nos. 4/6, 233–42. [22 refs.]

ii. ————————. Sur la prophylaxie de la leishmaniose forestière américaine. [**Prevention of American Forest Leishmaniasis**] *Ibid.*, 243–53. [24 refs.]

i. This is "forest yaws" (*pian-bois*) muco-cutaneous leishmaniasis caused by *Leishmania brasiliensis* Vianna, 1919, or *L. tropica guyanensis* Floch, 1954 [this *Bulletin*, 1955, v. 52, 1178], which can justifiably be called a scourge on a small scale, as it results in prolonged incapacity for work and its treatment is costly. It is concluded that the disease has an epidemiological cycle spread over several years. [The statistical basis

for this conclusion is inadequate: the greatest number of confirmed cases in any year was 29.] The great increase in mining and other prospecting expeditions into the hinterland probably accounts for an increase in cases seen.

62 species of *Phlebotomus* have been described in French Guiana. 12 named species have been infected naturally or in the laboratory in South America, but of 4 man-biting species in French Guiana only *P. anduzei* appears to be the natural vector of leishmaniasis. It is an exophilic forest species—practically no sandflies in Guiana enter houses—and, in contradistinction to Italy, residual spraying campaigns do not affect the disease in Guiana. In the island of Cayenne, despite the abundant presence of *P. anduzei*, leishmaniasis has not been seen. If introduced, there would be every probability of its wide dissemination.

ii. There are, fortunately, preventive measures against "forest yaws" other than residual insecticide house-spraying. The sandfly vectors can be attacked in the forest, where transmission takes place. DDT, BHC and particularly dieldrin are effective, and can be used on probable breeding places, tree trunks and holes, and the ground immediately round the trees. This work is easy to carry out and not costly. It appears to be effective for at least 1½ months during the rainy season and probably 3 months during the dry season. As sandflies have a small flight range, it is necessary to treat only a radius of 250 metres round the point to be protected. Individual prophylaxis with a dose of 4 mgm. per kgm. body weight of pentamidine has been used, with apparent good effects, in 6 persons probably exposed to infection for some weeks. It is suggested also that prophylaxis by a weekly dose of one of the 4-aminoquinolines might be attempted. These are thought to have a therapeutic effect on "forest yaws", though not so potent as that of the commonly used antimonial drugs. Judging by the results of the intradermal leishmanin reaction old infection, even if of sub-clinical intensity, leaves at least a partial immunity, and it is thought that some degree of immunity could be artificially stimulated by vaccination with killed cultures of leishmania [this *Bulletin*, 1956, v. 53, 429]. This has not yet been attempted by the author.

It is not possible to attack reservoir hosts of the infection, as they are too numerous and not even known completely. The dog is a known one, the cat and horse suspects. Among wild animals the capybara (*Hydrochoerus hydrochoerus*), the tapir (*Tapirus americanus*), the coati (*Nasua socialis* and *N. solitaria*), the opossum (*Didelphis paraguayensis*), the agouti (*Dasyprocta agouti*), the "pac" (*Coelogenys paca*) and various monkeys are at least suspects. Even if proof is lacking for individual species, it is considered certain that wild reservoir hosts must exist or the infection could not be maintained in practically uninhabited regions.

*B. B. Waddy*

## FEVERS OF THE TYPHUS GROUP

*In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.*

Mittermayer, T. & Kratochvíl, I. Nemoc Brill-Zinsserova v Košickom kraji. [**Brill-Zinsser Disease in Košice County**] *Časopis Lékařů Českých*. 1958, Mar. 14, v. 97, No. 11, 337–41. [47 refs.]

The English summary appended to the paper is as follows:—

"The authors present 6 cases of Brill-Zinsser disease in Košice county [Czechoslovakia], after an historical introduction. An epidemiological, serological and clinical analysis in these diagnosed cases is presented. Attention is called to the fact that in febrile cases where there is a typhus exanthem in older patients, it is necessary to consider Brill-Zinsser disease, at least in cases which have a typhus exanthem in the history. One of the patients came down with a classical rash."

Cohn, Z. A., Hahn, F. E., Ceglowski, W. & Bozeman, F. M. **Unstable Nucleic Acids of** *Rickettsia mooseri*. *Science*. 1958, Feb. 7, v. 127, 282–3. [12 refs.]

Spectrophotometric examination of purified suspensions of *Rickettsia mooseri* revealed that more ultraviolet(260 mμ)-absorbing materials were liberated during incubation at 36°C. for 3 hours than could be extracted from the organisms at the start of the experiment, suggesting a breakdown of nucleic acids. This conclusion was supported by balance studies in which spectrophotometric and chemical analyses showed that at 36°C. the appearance of 260mμ-absorbing materials in the medium was related to a complementary decrease in the nucleic acid fraction (extracted with 5% perchloric acid at 90°C.) of the rickettsiae. Analyses also indicated that ribonucleic acid comprised 75% of the nucleic acid components lost by the rickettsiae. Rickettsial suspensions which had lost toxicity for mice through incubation at 4°C. for 18 hours were readily reactivated by treatment with cofactors (diphosphopyridine nucleotide (DPN), adenosine triphosphate, coenzyme A and glutathione) [this *Bulletin*, 1957, v. 54, 940], but no reactivation of rickettsiae incubated at 36°C. for 3 hours could be obtained.

It is concluded that rickettsial inactivation is a complex phenomenon involving the reversible depletion of DPN and the irreversible loss of nucleic acids; the different results obtained at 36°C. and 4°C. suggest that enzymatic processes are concerned in the nucleic acid loss which accompanies inactivation at 36°C. *R. S. F. Hennessey*

Hersey, D. F., Colvin, Mayme C. & Shepard, C. C. **Studies on the Serologic Diagnosis of Murine Typhus and Rocky Mountain Spotted Fever. I. Experimental Infections in Guinea Pigs and Rabbits.** *J. Immunology.* 1957, Nov., v. 79, No. 5, 401–8. [13 refs.] **II. Human Infections.** *Ibid.*, 409–15.

Serum from rabbits and guineapigs infected experimentally with either murine typhus or Rocky Mountain spotted fever was examined at intervals by complement-fixation (CF) tests in chess-board titrations with varying amounts of soluble antigens prepared from *Rickettsia mooseri*, *R. rickettsi* and *R. akari*. In both infections antibody was detected earlier in the guineapig when up to 8 units of soluble antigen prepared by ether extraction of rickettsiae were employed in a " cold-overnight " type of CF test.

A similar observation was made on 35 human infections, suspected clinically to be either murine typhus or Rocky Mountain spotted fever. Serum from each patient gave a positive result earlier by CF test when the same soluble antigen was used in similarly increased amount. For comparison it was noted that 31 positive results were obtained from the same subjects with the erythrocyte-sensitizing substance test. When increased amounts of commercially prepared rickettsial soluble antigen were used 16 were found positive by CF test, whereas with the conventional 2 units of commercial antigen only 9 were positive. With the Weil-Felix test only 13 sera were positive. *R. G. Sommerville*

Sasa, M., Iimuro, I. & Miura, A. **Descriptions of the Nymph and Adult of *Trombicula nagayoi* Sasa *et al.*, 1950, and the Taxonomic and Ecological Notes with the Related Species. (Studies on Tsutsugamushi, Part 97.)** *Japanese J. Exper. Med.* 1957, Oct., v. 27, No. 5, 259–72, 4 pls. [14 refs.]

Quintane, G. Répartition géographique actuelle de la fièvre boutonneuse dans le Bassin Méditérranéen. [**Present Geographical Distribution of Boutonneuse Fever in the Mediterranean Basin**] [Thesis]. 67 pp., 2 maps. [Numerous refs.] 1954. Marseilles: Imprimerie Schneider, 16, Quai de Rive-Neuve.

This monograph represents a thesis presented by the author to the *Faculté Mixte de Médecine Générale et Coloniale et de Pharmacie de Marseille* in 1954.

He points out that the distribution of boutonneuse fever does not seem to have been assessed systematically since 1933. He has made a most painstaking survey of the literature and sets out, with comments and several case histories, detailed information regarding the incidence of the disease as far as could be ascertained in (1) the European Mediterranean basin, (2) the African Mediterranean basin and (3) the Asian Mediterranean

basin. The countries included under these headings are dealt with individually.

One map shows the principal foci in the Mediterranean coastal regions of France, and another shows the foci known in the Mediterranean basin in 1933, the extension therefrom since then and the new foci which have been recorded.

The author notes particularly the appearance of the disease in such places as far separated as Majorca, Cyprus, the Adriatic coast, Palestine, Turkey and Bulgaria.

This monograph contains much useful information.

*H. J. O.'D. Burke-Gaffney*

Pascu, Alexandrina, Ionescu, P. I., Sileanu, Lucia, Bodeanu, G. & Companet, V. Studiul unei epidemii de febră "Q". [**A Study of a Q Fever Epidemic**] *Microbiol., Parazitol. şi Epidemiol.* Bucharest. 1957, Jan.–Feb., v. 2, No. 1, 23–36, 6 text figs. & 6 figs. on 3 pls.

An outbreak of Q fever occurred in the region of Bod, Rumania, in December 1955; there were 21 cases in all and the source of infection was a cowman. A second outbreak occurred shortly afterwards at a farm 5 km. distant, with 60 cases among a total population at risk of over 100 persons; 63·3% of cases occurred in persons working in direct contact with infected cows, and the remainder occurred in clerical and other workers who evidently became infected by indirect contact. The diagnosis was established by serological means. *D. J. Bauer*

Vassiliadis, P. & Capsohas, S. La fièvre Q à Alexandrie. [**Q Fever in Alexandria**] *Ann. Soc. Belge de Méd. Trop.* 1957, Oct. 31, v. 37, No. 5, 749–51.

Serological evidence was found in the sera of 1 of 8 cattle and 3 of 10 sheep examined.

Blanc, G. & Bruneau, J. Présence chez une chauve-souris du Maroc *Eptesicus isabellinus* (Temminck) d'un virus de Q Fever. [**Presence of *Rickettsia burneti* in a Bat, *Eptesicus isabellinus* in Morocco**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 653–6, 7 figs. (3 on 3 pls.)

## YELLOW FEVER

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

MATTINGLY, P. F. **Genetical Aspects of the *Aëdes aegypti* Problem. I.—Taxonomy and Bionomics.** *Ann. Trop. Med. & Parasit.* 1957, Dec., v. 51, No. 4, 392–408. [Numerous refs.]

*Aëdes aegypti* shows considerable variation in its colour characteristics. The author makes use of the general ground colour of the thorax, and to a lesser degree the markings of the hind tarsi, to define three colour forms of this mosquito. The three forms have other differences which are non-morphological and concerned with behaviour and distribution. The three forms proposed are as follows:—

(1) *A. aegypti* sens. str., the type form. Variable in depth of colour but always either distinctly paler and browner than the blackish African subspecies [below], or with pale scaling on the first abdominal tergite [dorsal surface of the segment], or both. Extensions of pale scaling, if any, are limited to bleaching of the two dark areas on the back of the head or the pale scaling on the first abdominal tergite, or a combination of these two features. This, the type form, is distributed widely throughout the range of the species except inland Africa south of the Sahara. It is mainly domestic where it does occur in Africa; elsewhere it may be semi-wild, feeding and breeding fairly extensively in natural habitats.

(2) *A. aegypti* ssp. *formosus.* Differs from the type form in the markedly blackish appearance of the dark areas of the thorax and abdomen, and in lacking entirely any bleaching or extension of pale scaling on any part of the body. There are never any pale scales on the first abdominal tergite. Its geographical distribution is Africa south of the Sahara where, except for the type form and var. *queenslandensis* in coastal districts and some limited inland areas, it is the only form known. It is capable of existing as a wild mosquito, feeding on unknown hosts and breeding in natural small collections of water. In rural or urban conditions, however, it may adopt domestic habits.

(3) *A. aegypti* var. *queenslandensis.* A pale form in which the ground colour of the mesonotum [dorsal surface of the thorax] is not black but may be mid-brown, through shades of buff, to almost white. The pale bands at the bases of the abdominal tergites may extend onto the preceding segment; these pale bands may also extend backwards in the mid-line to form basal triangles or even a continuous median longitudinal pale line. There may be scattered pale scales on the dark areas of the abdominal tergites or on normally dark areas of the legs. This variety was first described in 1901 from northern Australia but specimens consistent with the features above are known from many parts of the world and its distribution is not dissimilar from that of the type form. Like the type form, it occurs in Africa only in coastal regions and certain limited inland

areas. In all parts of its range it is apparently entirely domestic, feeding and breeding in and around human habitations.

There is, in the early part of the paper, a considerable discussion on the correct name for this species. The author has studied specimens carefully in relation to a description by Linnaeus which some former workers in the group accepted as describing what is now so universally recognized as the yellow fever mosquito, *Aëdes aegypti*. The description is, however, in the author's view, of a pale form of *Aëdes* (*Ochlerotatus*) *caspius* found in Egypt. Properly, this mosquito should bear the name *A. aegypti* if international conventions of nomenclature are to be satisfied. The species known at present as *A. aegypti* could then be named *A. argenteus*. Nevertheless, it is proposed to avoid such changes and to apply to the International Commission on Zoological Nomenclature to fix the name *Aëdes aegypti* Linnaeus as connoting the yellow fever mosquito as now understood in medical science. It is probable that the type form is that differentiated above; this and the subspecies and variety are so designated provisionally pending final decisions on detail of this nature to be placed before the International Commission.

On more general matters it is reasoned that *A. aegypti* (the yellow fever mosquito as understood at present) may have originated in pre-glacial times from pale rock-pool-breeding forms in the southern Palaearctic region—that is, well north of the forest zone of tropical Africa. The distribution today of the type form and var. *queenslandensis* outside Africa is sporadic and, as for these two forms in Africa, often mainly coastal. They may well be comparatively recent introductions from coastal Africa.

This scholarly analysis of a complex problem, so important in its implications for medical science, is supported by a list of over 100 references and contains a very valuable summation of this literature with particular regard to variations in the breeding and feeding habits and distribution peripherally from human habitations of *A. aegypti*. All of this is taken into account in formulating the present case for the recognition of the forms proposed. The practical worker would derive much of interest from consulting the sections on geographical distribution and bionomics in the original. *D. S. Bertram*

See also p. 707, GILLETT, **On the Habits and Life History of Captive Emesine Bugs (Hemiptera: Reduviidae)**

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## DENGUE AND ALLIED FEVERS

See also p. 587, LUMSDEN, **The Activity Cycle of Domestic *Aëdes* (*Stegomyia*) *aegypti* (L.) (Dipt., Culicid.) in Southern Province, Tanganyika.**

See also p. 585, Muspratt, **The *Stegomyia* Mosquitoes of South Africa and some Neighbouring Territories. Including Chapters on the Mosquito-Borne Virus Diseases of the Ethiopian Zoo-Geographical Region of Africa.**

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## RABIES

Mahnke, P. F. Ein Beitrag zum derzeitigen Tollwutseuchengeschehen. [**Rabies Infection as it Exists Today**] *Ztschr. f. arztl. Fortbildung.* 1958, Jan. 1, v. 52, No. 1, 18–22, 3 figs. [Numerous refs.]

This paper which contains mainly a description of a case of human rabies in order to stress some points in prophylaxis begins with an account of the history of rabies infection and particularly of its extension in Germany since the Second World War. There are numerous references [see also this *Bulletin*, 1958, v. 55, 497].

The case occurred in a lad aged 16 years who caught a fox in a neighbouring poultry yard. He took the fox home (there is a photograph of the lad with the fox in his arms) where it died soon after without having caused any suspicion of its having a definite infection. The lad had been bitten by the fox on June 21, 1956 in the left thumb, but continued his work as a welder. On July 11th he fell while bicycling to work, by evening his left upper arm and shoulder became painful and he became restless. The next day his doctor sent him to hospital with the diagnosis of contusion of the chest. There is a short clinical account of the patient, who died on the 20th July, and of the pathological findings which confirmed the diagnosis of rabies. It was not possible to examine the body of the fox as its grave could not be found. Attention is drawn to the short incubation period in this case and to the importance of carrying out protective inoculation within the 48 hours after a wound has been inflicted by a possibly infected animal. *M. E. Delafield*

Demarchi, J. Épidémiologie et prophylaxie de la rage. [**Epidemiology and Prophylaxis of Rabies**] *Méd. Trop.* Marseilles. 1958, Jan.–Feb., v. 18, No. 1, 61–73.

A general account and discussion.

Barme, M. Le sérum antirabique dans le traitement des morsures de la face au Nord-Vietnam. [**Antirabic Serum in the Treatment of Bites of the Face in North Vietnam**] *Ann. Inst. Pasteur.* 1958, Mar., v. 94, No. 3, 384–6.

The English summary appended to the paper is as follows:—

"There exists in North-Vietnam strains of 'reinforced' street rabies

virus, so called because of their exceptional virulence. Bites of the face by animals infected with such strains are particularly severe.

" In these cases, phenol vaccine never prevents rabies. It seems even to shorten the incubation period.

" The addition to phenol vaccines of a raw local antirabic serum has no other effect than a marked prolongation of the incubation period.

" The purified and concentrated serum prepared in the Paris Pasteur Institute has allowed observation of the first cases of total protection."

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## PLAGUE

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Dulieu, L. La peste à Montpellier. [**The Plague in Montpellier**] *Montpellier Méd.* 1957, June, v. 51, No. 6, 787–810. [Bibliography.]

This paper gives much information about the many epidemics of plague in Montpellier, especially that of 1629–30, of which most has been recorded. [In old times the term " plague " might on occasion stand for a severe outbreak of some disease other than bubonic plague, but names like " The plague ", " The common plague " were specific in their meaning, and I know of no instance where there is reason to suspect that they were wrongly applied. Indeed all the tendency was in the opposite direction, and there was much concealment of plague deaths in the hope of escaping the terrors of the shut-up houses. Thus, when Pepys discovered that Mr. Hadley the clerk of his little parish had cut down the weekly return of plague deaths by a third, he was much distressed to think that probably such trickery was a-foot in other parishes, as indeed it was; so that the figure of approximately 69,000 plague deaths given in the London bills of mortality for 1665 should by right be increased to at least 100,000.]

In times of plague in Montpellier there seems to have been much less chaos than prevailed in similar times in London, possibly because of the much smaller population at risk and also because of the better arrangements that were made. As early as 1481 there were appointed *Capitaines de peste* (the style was changed later to *Capitaines de santé*) who controlled a number of plague surgeons, which varied according to requirements. Because the standard treatment was incision of the buboes, plague was regarded as mainly a surgeon's task, though physicians were employed for the initial diagnosis.

The first known victim of the disease in 1629 was a Capuchin monk who showed a bubo in the groin and another in the axilla, as well as 4 plague carbuncles. At first the sick were isolated in their own homes, later in existing hospitals or in requisitioned houses; but as the infection spread, hutments were hastily erected in the neighbourhood of the town and especially on a large area of land which was always reserved for this purpose. Wherever the sick were collected, there were always surgeons in residence to watch over them. For 8 months the life of the town was wholly paralysed and all else was neglected for the fight against plague—which was regarded as highly contagious. Capuchins visiting the plague-stricken were forbidden to come into touch with them. Their robes had to be short enough to clear the ground. On entering an infected house they were preceded by a brazier sprinkled with incense. In administering the Sacrament, the Host was presented at the end of a baton fitted with a silver cross, and a torch interposed between the face of the server and that of the sick man. On returning to their monastery after exposure, the monks washed, sprinkled themselves with scent, changed their clothing and finally took a full meal.

When the epidemic was over, the whole town was cleansed—according to the ideas of the time—with amazing throroughness. The entire population was moved out and accommodated in lines of huts and sheds. First, the abandoned streets were sluiced with fresh and salt water; next the houses were dealt with in turn. All rubbish was burnt. The floors, walls and ceilings were washed down with water, vinegar, and lime. Where cases of plague had occurred, the house was smoked for 3 or 4 days with fumigants such as sulphur, charcoal, arsenic, resins, or aromatic herbs. When the cleansing of each house was completed, a white cross was painted on the entrance door. These operations took 3 months to carry out.

The detailed and graphic description of the Montpellier plague of 1629–30, from which the foregoing particulars—with many more—were taken, came from the hand of François Ranchin, Professor of Medicine and Chancellor of the University. He passed through that terrible time unscathed, only to die of plague in the succeeding outbreak of 1641.

*W. P. MacArthur*

Fox, E. N. & Higuchi, K. **Synthesis of the Fraction I Antigenic Protein by *Pasteurella pestis*.** *J. Bacteriology.* 1958, Feb., v. 75, No. 2, 209–16, 1 fig. [19 refs.]

"The temperature dependent synthesis of the fraction I antigen of *Pasteurella pestis* has been studied in nonproliferating, washed cell suspensions incubated at 37 C but initially grown at a lower temperature (26 C) to suppress prior antigen formation. A sensitive and serologically specific hemagglutination technique was used to measure the fraction I protein synthesis. In the presence of phosphate buffer and adequate aeration

only casein hydrolyzate was required for protein synthesis. Neither carbohydrates nor peptide fractions were stimulatory.

" Chloramphenicol (1 $\mu$g per ml) completely inhibited antigen formation without appreciably reducing oxygen uptake by the system. Dinitrophenol and diazouracil only partially inhibited antigen synthesis.

" Sonically disrupted cells were capable of antigen synthesis only if the supernatant as well as the debris (separated by high-speed centrifugation) were recombined. The active constituent in the soluble fraction was non-dialyzable and resistant to trypsin, ribonuclease and desoxyribonuclease. The site of antigen synthesis was associated with the debris; no fraction I antigen was detectable in solution."

KEPPIE, J., COCKING, E. C. & SMITH, H. **A Non-Toxic Complex from *Pasteurella pestis* which immunises both Guineapigs and Mice.** *Lancet.* 1958, Feb. 1, 246–7. [10 refs.]

The preparation of a non-toxic complex formed *in vitro* and *in vivo* by *Pasteurella pestis* is described. The complex was obtained by treating an aqueous solution containing $1 \times 10^{10}$ organisms per ml., obtained from infected guineapigs, with ultrasonic waves for one hour at 3°C. The residue was resuspended in water and similarly treated with ultrasonic waves. This procedure was repeated and the twice-washed residue (which contained no intact *Pasteurella pestis* and constituted about 30% of the whole organism) dissolved almost completely in 0·05 M $NaHCO_3$ or 0·02 M tris(hydroxymethyl)-aminomethane at *p*H 8·5 or 8·7 respectively. This residue, at a concentration equivalent to $1 \times 10^{10}$ organisms per ml. either as a suspension in saline solution (heated at 60°C. for one hour) or as a solution in 0·05 M $NaHCO_3$ buffer at *p*H 8·5 (filtered through Millipore), gave satisfactory results in active immunity tests in mice and guineapigs. Satisfactory tests were also obtained with ultrasonic residues as saline suspensions heated to 60°C. for one hour and prepared *in vitro* from cultures of the virulent L37 strain or the avirulent Tjiwidej strain.

The authors suggest that *Pasteurella pestis* has a cell-wall complex containing lipid, to which the non-toxic envelope substance fraction 1 [this *Bulletin*, 1952, v. 49, 616] is attached, firmly near the cell wall and loosely in the body of the envelope. The virulence antigens may be similarly attached. This cell-wall complex with the attached envelope is considered to be the best antigenic material for the protection of all species and may form the basis of an efficient dead vaccine for man.

*Morag C. Timbury*

PARKER, D. D. **Seasonal Occurrence of Fleas on Antelope Ground Squirrels in the Great Salt Lake Desert.** *J. Econom. Entom.* 1958, Feb., v. 51, No. 1, 32–6, 3 figs.

Antelope ground squirrels range throughout the desert regions west of the Rocky mountains. One of them, *Citellus leucurus leucurus* occurs

over a major portion of the range of the entire species. This squirrel and its fleas have been known to harbour *Pasteurella pestis* in nature and its fleas have been found naturally infected with *Brucella tularensis*.

This investigation was confined to a single locality in the eastern edge of the range of the subspecies where trapping was conducted during the period from March 1955 to March 1956, and resulted in the collection of 2,715 fleas from 138 squirrels.

Owing to the shortness of the period no very definite conclusions can be drawn from this survey except to say that *Thrassis bacchi gladiolis* was the most abundant flea and was collected all year round, being especially numerous in the cool season as shown by its index figure, which rose from 3·4 in September to 34·4 in December. *Hoplopsyllus anomalus* was the next most abundant flea but it was more common in the warm weather when it reached an index of 23·7 in August. *Rhadinopsylla heiseri* was collected in moderate numbers in the winter only. Other fleas (including one *Pulex irritans*) were collected in insignificant numbers.

*H. S. Leeson*

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## CHOLERA

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.*

Mukerjee, S., Guha, D. K. & Roy, U. K. G. **Studies on Typing of Cholera by Bacteriophage. Part I. Phage Typing of *Vibrio cholerae* from Calcutta Epidemics.** *Ann. Biochem. & Exper. Med.* Calcutta. 1957, v. 17, No. 5, 161–76. [20 refs.]

200 strains of *Vibrio cholerae*, isolated from patients in Calcutta, were typed with the help of 30 freshly isolated cholera phages. The phages were divided into 4 groups according to their lytic action on some vibrio strains. The vibrio strains were classified into 5 types by the pattern of their sensitivity to the 4 groups of phage. No relation was observed between serological sub-types and phage sensitivity.

Phage typing of vibrio strains differed from Vi phage typing of *Salmonella* strains in that the phages had a wide host range (89–100% of the vibrio strains were lysed by more than one of the phage groups) and that phage which was adapted to one particular strain did not then lose its affinity for other strains. Moreover, vibrios could not be typed by lysogenicity patterns as only 10 out of the 200 strains were found to carry phages.

The authors plan to use their method of classification of vibrios to trace the spread of infection in localized epidemics. *Janice Taverne*

Mallik, N. C. **Sensitivity of *Vibrio cholera* to Tetracycline.** *Calcutta Med. J.* 1958, Jan., v. 55, No. 1, 1–3.

"(1) 67 strains of vibrio belonging to Group A Subgroup I (type Inaba-41, type Ogawa-26) were examined for bacteriostasis sensitivity to tetracycline hydrochloride. It was found that they were all sensitive to the presence of the drug at varying concentrations from 1 μg per ml. to 10 μg per ml. when incubated in its presence at 37°C. in 1% peptone water (pH 8·0).

"(2) The bactericidal action was also studied on the strain. The concentrations at which vibrios were killed were found to vary from 2 μg. to 20 μg. per ml. in 1% peptone water (pH 8·0).

"(3) The amount of the inoculum did not alter the bacteriostatic or the bactericidal titre of the drug.

"(4) No strain of vibrio could be trained to be resistant to the drug."

[See also this *Bulletin*, 1951, v. 48, 988; 1952, v. 49, 395; 1956, v. 53, 1424.]

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## AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.*

Freedman, L. & Elsdon-Dew, R. **Size Variation in *Entamoeba histolytica*.** [Correspondence.] *Nature.* 1958, Feb. 8, v. 181, 433–4, 3 figs.

Work, yet unpublished, by these authors has shown that the variation in the type of bacterial flora present in the culture is capable of causing significant variation in the mean diameter of trophozoites of a uniform strain of *E. histolytica*; when such cultures are mixed the size distribution curve is, however, unimodal. On the other hand when cultures of "large" and "small" races are mixed, the resulting cultures still show bimodal distribution. The authors conclude that the two races have therefore different genetic make-up and should be given separate specific status as *E. histolytica* and *Entamoeba hartmanni* Prowazek, 1912.

[See this *Bulletin*, 1957, v. 54, 1317.] *W. E. Ormerod*

Piganiol, G. & Chauche. Contribution à l'étude de l'amibiase du rapatrié. [**Amoebiasis in Repatriates**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 749–54. Discussion 755–8.

166 soldiers, returned to France from overseas, with intestinal amoebiasis, have been investigated; the great majority of them had acquired

their infections in countries in the Far East. No features were discernible in the disease in these various men which were peculiar to its country of origin. Most of the patients had previously been treated with emetine, and nearly half of these on 2 or 3 occasions during the several years that they had harboured the infection. Most of the men complained of alternating diarrhoea and constipation; about a quarter of them suffered true dysenteric attacks. Others suffered from troubles of a more indeterminate nature. 38 developed hepatitis and in 5 of these there followed liver abscess formation; the hepatitis subsided in the remainder.

Riou, in comment, regretted that the enquiry did not extend to the spread of the infection to conjugal and family contacts. He referred to the extraordinary effects of the infection in patients he himself had encountered, and commented on the difficulties of diagnosis and of treatment; and he stressed the need for repeated courses of treatment over a period of 6 to 8 months with the various drugs appropriate to the individual case in order to eradicate the infection. *A. R. D. Adams*

Payet, M., Nétik, J., Armengaud, M. & Bèzes, H. Les amibiases coliques mortelles en milieu africain à Dakar. (A propos de 10 observations.) [**10 Fatal Cases of Amoebic Colitis in Africans in Dakar**] *Bull. Méd. de l'A.O.F.* Dakar. 1957, Oct.–Dec., v. 2, No. 4, 384–92, 5 figs.

The English summary appended to the paper is as follows:—

"Authors relate 10 observations of fatal colic amebiasis followed in one year and confirmed by pathologic examination. Different clinical forms of fatal exceptionally acute amebiasis observed are as follows: sclerohypertrophic colic pseudo-tuberculosis, peritoneal form, acute suprarenal unsufficiency form, septicemic form, choleriform type, acute gastroenteritis form, typhoid form. Some common clinical symptoms allow the diagnosis of this affection, whereas stool examinations did not show presence of ameba. On the other hand, no morbid association has been proved.

"Death results of peritonitis by perforation.

"Authors emphasize the imperative necessity of treating the serious amebiasis by emetine."

Sankalé, M. & Rivoalen, A. Traitement de l'amibiase intestinale par un dérivé dihalogéné de la quinoléine. [**Treatment of Intestinal Amoebiasis with a di-Halogen Quinoline Derivative**] *Méd. Trop.* Marseilles. 1957, Nov.–Dec., v. 17, No. 6, 876–80.

The halogenated iodoquinolines are effective intestinal contact amoebicides. The chloroquinolines, such as Resochin [chloroquine], are not;

they are freely absorbed from the bowel and are effective extra-intestinal amoebicides. A combination of Yatren and of Resochin results in a preparation known as Resotren (described as di-7-iodo 8-oxyquinoline-5-sulphonate of 7-chloro-4 (4-diethylamino 1-methyl-butylamino)-quinoline) [this *Bulletin*, 1954, v. 51, 586, 924, 925; 1955, v. 52, 899]. This is almost insoluble in water; it is put up in the form of tablets each containing 0·5 gm. of the drug and 0·006 gm. of extract of belladonna, with a suitable excipient for oral use.

Patients with intestinal amoebiasis have been treated with Resotren alone (3 to 6 tablets daily for 12 days), and with Resotren and penicillin or a tetracycline antibiotic. The effect on the parasitic infection appears to have been only moderately satisfactory, and the drug caused a severe diarrhoea which militated against its use. 4 patients with concurrent malaria were relieved of this by the Resotren treatment.

*A. R. D. Adams*

Paroli, E. Influenza dell'emetina sull'E.C.G., sul tasso cardiaco e cerebrale di cocarbossilasi e sulla fosforilazione della tiamina " in vitro ". (Contributo sperimentale allo studio della ipovitaminosi B1 come condizione di intolleranza all'emetina.) [**Influence of Emetine on the Electrocardiograph, on Cardiac and Cerebral Cocarboxylase and on the Phosphorylation of Thiamine** *in vitro*] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1957, Dec., v. 38, No. 12, 611–24, 2 figs. [11 refs.]

The English summary appended to the paper is as follows:—

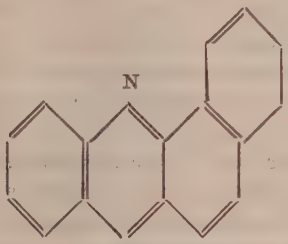
" Induced changes on E.C.G. and D.P.T. [thiamine pyrophosphate] levels in heart and brain, by emetine administration, were studied in normal and thiamine deficient pigeons. The emetine effect on D.P.T. synthesis by ATP [adenosine triphosphate] and ATP-thiamine phosphokinase obtained from rat liver was investigated ' in vitro '.

" In normal pigeons intravenous administration of 7 to 9 mgm/kg., body weight, induce delayed condition and heart rhythm disturbances. Similar effects were found to be produced by a dose of 4·5 mgm/kg. of emetine given intravenously when thiamine deficiency preexisted. On the other hand, a cardiotoxic dose of emetine (8 mgm/kg. b. w.), given intravenously, was found very slightly to decrease the D.P.T. content in heart and brain. Moreover in thiamine deficient pigeons intravenous injection of 4·5 mgm/kg. b. w. was found to induce a decrease of D.P.T. in heart, in respect of controls.

" It was not proved that emetine does influence the D.P.T. synthesis by liver ATP-thiamine phosphokinase ' in vitro '."

Thompson, P. E., McCarthy, D. A., Reinertson, J. W., Bayles, A. & Najarian, H. **Antiamebic Studies on 7-(3-Octylaminopropylamino)-Benz [c] Acridine Dihydrochloride.** *Antibiotics & Chemotherapy.* New York. 1958, Jan., v. 8, No. 1, 37–46. [17 refs.]

The benzacridine named in the title has proved active *in vitro*, as well as *in vivo*, against *E. histolytica* and has the following constitution:




$NH(CH_2)_3NH.(CH_2)_7.CH_3$
$2\,HCl.\,H_2O$

It is a heat-stable powder, yellow in colour and reasonably soluble in water. The methods used *in vitro* for antiamoebic activity against *E. histolytica* in mixed and in mono-bacterial cultures as well as in presence of *T. cruzi* have been described [this *Bulletin*, 1952, v. 49, 511; 1956, v. 53, 191]. Intestinal infections in rats and dogs, the former produced by intracaecal and the latter by intrarectal inoculation were studied and also intra-hepatic infections in hamsters. Rats received the drug in diet and by gavage, and hamsters directly by mouth. The diet of the dogs consisted of canned salmon, yeast and cod-liver oil. Drug was given orally twice daily 5 days per week for 2 weeks and the course of infection was observed in colonic aspirates 3 times weekly. Careful analysis of the *in vitro* results and concomitant determination of oxidation-reduction potentials suggested that the drug had a direct amoebicidal action. In rats it was more active by weight than acetarsone, carbarsone, chiniofon, diiodohydroxyquinoline or biallylamicol [Camoform]. In dogs cures were obtained and there were few untoward effects, the new drug being more active than the established amoebicides listed above. In hepatic infections in hamsters the acridine under test was much more effective than chloroquine. These results are conveniently summarized in tables.

The activity of the drug *in vitro* as well as against intestinal and hepatic infections in animals, combined with rapidity of action, suggest potentialities in treatment of human infections. *J. D. Fulton*

## RELAPSING FEVER AND OTHER SPIROCHAETOSES

Pospelova-Shtrom, M. V. [**On Food Resources of Ticks—Vectors of Tick-Borne Relapsing Fever in Inhabited Localities**] *Zool. Zh.* Moscow. 1956, v. 35, Pt. 4, 529–34, 2 figs. [In Russian.] English summary, Suppl. p. 6. [Summary taken from *Rev. Applied Entom.* Ser. B. 1958, Feb., v. 46, Pt. 2, 17.]

To ascertain the hosts of *Ornithodoros* (*Alectorobius*) *tholozani* (Lab. & Mégn.) in inhabited areas, precipitin tests were carried out to identify the blood in the stomach contents of 3,356 fully fed examples of all stages, of which 2,753 were collected in a mountain village in Tadzhikistan and 603 in a foothill village in southern Kirgizia. Positive reactions were obtained with 99·5 per cent. of the ticks and showed that the percentages that had fed on the different kinds of hosts were 80·5 on Bovids (cattle, sheep and goats), 5·4 on horses, 7·6 on dogs and cats, 2·9 on hens and 1 on man, the hosts of the remainder being pigs and rodents. The figures for the two areas showed the same order of host preference, and differences between them could be explained by the effects of local conditions on host availability. Cattle, sheep and goats were the preferred hosts of larvae and nymphs as well as adults, and there was no evidence of any seasonal change in host selection.

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## YAWS AND OTHER TREPONEMATOSES

Hackett, C. J. [M.D., F.R.C.P.], in co-operation with an International Group of Experts on Yaws and participants at the International Conference on Yaws Control, Enugu, Nigeria, 1955. **An International Nomenclature on Yaws Lesions.** *World Health Organization Monograph Series No. 36.* 103 pp., 34 figs. on 76 pls. [Numerous refs.] 1957. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [20s.; $4.00; Sw.fr. 12.–.]

This small volume is much more attractive than its title. There are only 13 pages of text but 75 pages are occupied by photographs of a very high standard, each illustrating an important aspect of yaws. Each photograph occupies a whole page and is a delight to study.

The introduction explains how the need for an international nomenclature became an urgent necessity when long-acting penicillin made mass surveys and treatment campaigns capable of great success.

Terms used in dermatology and incorporated in the nomenclature are carefully defined. The following international nomenclature is then put forward:—

| | |
|---|---|
| | EARLY YAWS |
| *Initial Yaws* | (i) papillomatous (ii) ulcero-papillomatous |
| *Cutaneous Early Yaws* | Macules: erythematous macular early yaws, squamous macular early yaws<br>Maculo-papules: squamous maculo-papular early yaws<br>Papules: simple papular early yaws, umbilicate papular early yaws<br>Micro-papules: acuminate micro-papular early yaws, squamous micro-papular early yaws<br>Plaques of early yaws<br>Nodules: nodular early yaws<br>Papillomata |
| *Mucosal Early Yaws* | Mucosal maculo-papular early yaws, mucosal papillomata |
| *Early Yaws of the Palms and Soles* | Palmar or plantar papillomata, squamous macular palmar or plantar early yaws<br>Hyperkeratotic macular palmar or plantar early yaws |
| *Early Yaws of the Bones and Joints* | Periostitis of early yaws, osteitis of early yaws, osteo-periostitis of early yaws, goundou, sabre tibia, ganglion of early yaws, hydrarthrosis of early yaws |
| *Latent Early Yaws* | |
| | LATE YAWS |
| *Cutaneous Late Yaws* | Plaques of late yaws<br>Nodules: nodular late yaws (i) cutaneous (ii) subcutaneous<br>Ulcerated nodular late yaws (i) superficial (ii) deep |
| *Late Yaws of the Palms and Soles* | Hyperkeratotic palmar or plantar late yaws |
| *Late Yaws of the Bones and Joints* | Gummatous periostitis, hypertrophic periostitis of late yaws, gummatous osteitis, gummatous osteo-periostitis, arthritis, gangosa, ganglion of late yaws, hydrarthrosis of late yaws, bursitis |
| *Other Late Yaws* | Juxta-articular nodules |
| *Latent Late Yaws* | |

Each of these lesions is illustrated and in parallel columns synonyms and explanatory comments are given. In Annexe I an abbreviated list of the international nomenclature is compared with the WHO classification of yaws into 9 groups [this *Bulletin*, 1953, v. 50, 775; *Bull. Hyg.*, 1953, v. 28, 815] and the classification of yaws patients in mass campaigns, HACKETT and GUTHE [this *Bulletin*, 1957, v. 54, 689].

It is impossible to speak too highly of this book which should be

obtained by every medical worker in the tropics and by all those connected with anti-yaws campaigns.

[The author has achieved success by limiting his topic. A supplement giving an indication of the treatment required and expected speed of recovery in each type might be helpful. A glossary explaining the derivation of the terms so clearly defined would be an aid to intelligent memorization.] *F. J. Wright*

HASSELMANN, C. M. **Clinical Aspects and Diagnosis of Yaws (Framboesia tropica).** *J. Indian Med. Ass.* 1958. Feb. 1, v. 30, No. 3, 71–9, 12 figs. on 2 pls.

An account of the principal features, with illustrations.

FRIEDHEIM, E. A. H. Effet spirochétocide immédiat de la pénicilline *per os* et de trois préparations bismuthiques dans le pian. Action du propyloldimercaptide de bismuth "B.F.B." [**Immediate Spirochaetocidal Effect of Oral Penicillin and 3 Bismuth Preparations in Yaws. Action of Bismuth Propyloldimercaptide (BFB)**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 128–35.

The author compared the immediate effects of (i) oral penicillin (Commercial Solvents, New York); (ii) propyloldimercaptide of bismuth (BFB) *per os* alone and with penicillin, and given intravenously; and (iii) Oléo Bismuth (Aubry) and Bivatol (Roussel).

48 patients with primary and secondary yaws were divided into 6 unequal groups which were treated by the agents described, singly and in combination. Scrapings of lesions were examined for treponemata 3 days before treatment and daily for up to 8 days afterwards (up to 19 days in the case of those treated with Oléo Bi).

Daily oral administration of BFB (5 daily doses of 15—25 mgm./kgm.) and penicillin (250,000 to 1 million units for 3 to 7 days) caused the total disappearance of treponemata in 5 days. The administration of these agents together (with smaller doses of penicillin) caused the disappearance a day earlier.

BFB given intravenously was equally successful (2 or 3 daily doses 1·3 to 1·7 mgm./kgm.) but Oléo Bi and Bivatol given intramuscularly were not. There were no side effects with BFB or penicillin.

Penicillin and BFB appeared to be synergic. *B. G. Maegraith*

## LEPROSY

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.*

Chambon, L., Destombes, P. & Netter, R. Étude de l'allergie à la lépromine chez des lépreux vaccinés par le B.C.G. [**A Study of Allergy to Lepromin in Leprosy Patients vaccinated with BCG**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 631–3.

The study included 27 patients of whom 12 were lepromatous, 8 undifferentiated, and 7 tuberculoid. Two years after vaccination with BCG [this *Bulletin*, 1957, v. 54, 176] 2 lepromatous patients had been converted from negative Mitsuda to positive, and 1 who had been positive to begin with remained positive; the others remained negative. Of the undifferentiated 4 remained negative, 1 was converted to positive, and 3 remained positive. Of the tuberculoids 5 were converted to positive and 2 remained positive. The Mantoux reaction was originally positive in only 10 patients, but after vaccination it became positive in all.

The Mitsuda conversion in the 2 lepromatous and 1 undifferentiated type patients was probably due to the BCG vaccination, though the conversion in the tuberculoid cases was in the course of natural evolution.

*Ernest Muir*

Binford, C. H. **Leprosy as a Diagnostic Problem in Surgical Pathology.** *Southern Med. J.* 1958, Feb., v. 51, No. 2, 200–207, 3 figs.

The author describes 6 cases of leprosy, 5 of them of the lepromatous and 1 of the tuberculoid form, and all of them typical in their clinical and histological appearances. Because of inexperience of leprosy this disease was not suspected in any of the patients, in spite of repeated examinations by dermatological and pathological experts, until periods up to 4 years. In the discussion which followed the reading of this paper it was emphasized that leprosy is a communicable disease and there is insufficient awareness among physicians that leprosy is endemic in the United States, and that it is more prevalent than is commonly supposed.

*Ernest Muir*

See also p. 697, Chams & Sadoughi, Manifestations oculaires de la lèpre. [**Ocular Manifestations of Leprosy**]

Floch, H., Fauran, P. & Mailloux, M. Mode d'action des sulfones dans la lèpre (XI). Comment agit la sulfone monoéthylée administrée par la voie intramusculaire. [**Mode of Action of Sulphones in Leprosy (XI). How does Monoethyl Sulphone act when administered Intramuscularly ?**] *Arch. Inst. Pasteur de la Guyane Française et de l'Inini. Publication No. 424.* 1957, May, 12 pp.

The authors begin by comparing the solubility and toxicity of monoethyl sulphone (3459 CT) with the similar qualities in monopropyl and dipropyl sulphone [this *Bulletin*, 1957, v. 54, 441 *bis*]. They consider that monosubstituted sulphones act in leprosy chiefly by means of the whole molecule, without breaking down to any extent into DDS. In order to find a sulphone derivative which is most therapeutically active, and at the same time least toxic, the authors treated 10 leprosy patients with intramuscular injections of 3459 CT, the patients having been previously accustomed to sulphone by the ordinary DDS treatment. 1·80 gm. was injected into each patient. The blood and urine concentrations for the following 30 days after injection are given in tabular form; the maximum, minimum and mean readings of the 10 patients are given; and the findings before and after hydrolysis are taken so as to show how much of the sulphone was in the form of DDS and how much in the form of 3459.

The concentrations varied considerably from day to day in both blood and urine, the highest blood concentration being 0·60 mgm.% before hydrolysis and 0·93 mgm.% after, occurring on the 16th day. After the 24th day the blood concentration was little more than a trace, though considerable concentrations remained in the urine up to the 30th day.

This experiment shows that monoethyl sulphone is transformed to a large extent into DDS in the body, and its action is taken to be by virtue of the DDS formed, but also to a certain extent by virtue of its own untransformed molecule. *Ernest Muir*

Wallace, J. H., Elek, S. D. & Hanks, J. H. **Limited Multiplication of *Mycobacterium lepraemurium* in Cell Cultures.** *Proc. Soc. Exper. Biol. & Med.* 1958, Jan., v. 97, No. 1, 101–4, 1 fig. [14 refs.]

The limited multiplication claimed for this organism was 2·8 times the original population and the success is attributed to:—(1) a high incidence of active bacilli assured by explanting spleen cells from infected mice at a time when the infecting bacilli were in the logarithmic phase of growth or by infecting *in vitro* Earle's L strain of mouse fibrocytes with an average of 10 bacilli per cell, the bacilli being protected during phagocytosis by serum albumin and yeast supplement; (2) decreasing the inhibitory action of serum by culturing in fluids containing low concentrations of body fluids. The numbers of bacilli present in the cultures before and after incubation were estimated by placing standard size drops of the disintegrated culture on slides and counting the number of bacilli per field. In the spleen explants, the number of bacilli was approximately doubled during the first 8 days, and no further increase occurred after 21 days' incubation. Multiplication in the fibrocytes occurred only when 0·2 mgm. hydrocortisone per ml. was present in the medium and no further increase occurred after 14 days' incubation. Infection of fibrocytes was also effected by mixing the cells with spleen cells containing

*Mycobacterium lepraemurium*; the fibrocytes phagocytosed the spleen cells, but multiplication of the bacilli occurred only when hydrocortisone was present.

The doubling of the population during 8 days' incubation is very similar to the maximum rate of multiplication observed *in vivo*.

*S. R. M. Bushby*

Rees, R. J. W. & Wong, P. C. **Limited Multiplication of** *M. lepraemurium* **in Tissue Culture.** [Correspondence.] *Nature*. 1958, Feb. 1, v. 181, 359–60.

The number of acid-fast bacilli present in explants of the spleen of mice infected with *Myco. lepraemurium*, increase two-fold during cultivation for 15 days in a medium containing 20% horse serum, 5% chick embryo extract and 75% Hanks's balanced salt solution. No further increase occurred when the incubation time was prolonged to 29 days and no increase occurred in the presence of 100 μgm. streptomycin and 1 μgm. isoniazid per ml.

This increase in the number of bacilli was shown by making counts with the Breed technique [this *Bulletin*, 1954, v. 51, 808] on the cultures after digestion with trypsin, homogenization in a Ten Broeck grinder and exposure to ultrasonic vibration. The failure of further multiplication to occur during the second 15 days' incubation is assumed to be due to disintegration of the infected cells and consequent exposure of the bacilli to the deleterious effects of the serum in the culture medium; exposure to serum has been shown by Hanks and Gray [this *Bulletin*, 1955, v. 52, 543] to inhibit the endogenous respiration of this organism. The generation time of the bacilli in this tissue culture corresponds very closely to the 13 days which is calculated for the organisms *in vivo* [*ibid*, 1957, v. 54, 1420].

*S. R. M. Bushby*

Enselme, J., Marie-Suzanne (Soeur) & Tigaud, J. Étude électrophorétique des protéines sériques de rats atteints de lèpres murines. [**Electrophoretic Study of Serum Proteins in Rats with Murine Leprosy**] *C.R. Soc. Biol.* 1957, v. 151, No. 6, 1220–21.

The authors studied the serum protein levels by electrophoresis in rats inoculated with Stefansky's bacillus which had been cultivated on the chick embryo and compared them with those of rats inoculated with *Mycobacterium marianum* and of normal rats. The results are shown in a table.

There was a diminution of the level of the albumins and a significant rise in gamma globulins in the rats inoculated with Stefansky's bacillus. No significant change in the gamma globulins was found in rats inoculated with *Mycobacterium marianum*.

The results with Stefansky's bacillus differ from those obtained by Nishimura and Kono [this *Bulletin*, 1955, v. 52, 548] who found no such electrophoretic changes in the serum of rats infected with this organism. *H. J. O'D. Burke-Gaffney*

Buttle, G. A. H., D'Arcy, P. F. & Howard, E. M. **The Influence of Cortisone and Hydrocortisone Acetates on the Course of *Mycobacterium lepraemurium* Infection in Rats.** *Brit. J. Pharmacol. & Chemotherapy.* 1958, Mar., v. 13, No. 1, 95–7, 2 figs.

"Prolonged administration of cortisone acetate or hydrocortisone acetate produces a decrease in the rate of growth of treated rats. In this respect the effect of the latter steroid is the more pronounced. Lepromata in the steroid treated animals are significantly smaller than those in the control rats. This difference is more pronounced with the cortisone acetate treatment. However, whilst there is no appreciable difference in the distribution of organisms in the lepromata, the spread of infection is not increased by the steroid treatment, as the number of animals showing acid fast organisms in the spleen is no greater in the treated groups than in the controls."

Hirano, N. & Sushida, K. **Chemotherapy of Murine Leprosy. 2. The Effects of Isonicotinoyl-3.4-Dimethoxybenzal Hydrazone.** *Yokohama Med. Bull.* 1957, Apr., v. 8, No. 2, 87–92.

This assessment was made in mice infected subcutaneously over the sternum with *Mycobacterium lepraemurium* from leprous tissue. Previous experiments [this *Bulletin*, 1957, v. 54, 836] showed that the introduction of a methoxy radicle into the 3 position of isonicotinyl-4-hydroxybenzal hydrazone increased the activity against murine leprosy. In this present report the authors show that the introduction of a second methoxy radicle into the 4 position in place of the hydroxy group increases this activity still further.

In the first experiment groups of mice were treated orally each day with 2 mgm. of the dimethoxy derivative, 3 mgm. of the monomethoxy derivative and 2 mgm. of isoniazid, for 65 days from the 26th day of infection. Although the liver and spleen did not become involved in any of these mice, the gross appearance and the number of bacilli at the injection site showed isoniazid to be inferior to either of the other drugs; in the 2 groups of 14 animals each, treated with the hydrazones, 5 in each showed no acid-fast bacilli at the injection site compared with only 1 of the 12 treated with isoniazid. The bacilli in the animals treated with the di-methoxy hydrazone were mainly degenerate forms.

In the second experiment with 40 animals treatment was delayed for 4 months and then continued for 4 months. An unstated number of

the animals died during the experiment and 16 died definitely of an intercurrent infection. The results on only 14 of the animals are given; of the 4 given the mono-methoxy hydrazone, 2 showed gross infection and 2 slight infection; of the 6 given the dimethoxy hydrazone, 2 showed gross infection, 2 slight infection and 2 were free from infection; the 4 given isoniazid all showed gross evidence of the infection.

In the third experiment, 6 mice were treated daily with 5 mgm. of the dimethoxy compound for 60 days from 6 months after the day of infection; the local lesions healed in 4 days in 1 animal and in 3–7 weeks in the others. Viable acid-fast bacilli were, however, found in 4 of the animals.

*S. R. M. Bushby*

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## HELMINTHIASIS

*In this section abstracts are arranged as far as possible in the following order:*—TREMATODES *(schistosomes, other flukes);* CESTODES *(Diphyllobothrium, Taenia, Echinococcus, other cestodes);* NEMATODES *(Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

MACLEAN, G., WEBBE, G. & MSANGI, A. S. **A Report on a Bilharzia and Molluscan Survey in the Tanga District of Tanganyika.** *East African Med. J.* 1958, Jan., v. 35, No. 1, 7–22, 1 map.

Human schistosomiasis is stated to be widespread in Tanganyika. This paper records a contribution towards remedying the deficiency in detailed surveys. The Annual Medical Report of 1955 gave a total of 17,531 infections with *Schistosoma haematobium* and 3,835 with *S. mansoni*. Six infections with *S. japonicum* were reported in 1954–55. A survey in 1950 showed 90·8% infection in 196 children in a school in the Northern Province. In two areas of Bukoba district *S. mansoni* was found but not in a third. In six areas of northern Tanganyika examination of 1,877 persons revealed 240 *S. haematobium* and 86 *S. mansoni* infections: in the 5 to 9 age-group infection rates of 53% *S. haematobium* and 30% *S. mansoni* were found.

The present survey relates to the Usambara foothills, and plains below, in Tanga district. Ova of *S. haematobium* were found in 38·8% of 3,400 urines from persons of all ages. The highest incidence, 66·6%, was in males of the 11–15 age-group. The rate of infection was by no means the same throughout the district. 7 out of 900 stools examined showed *S. mansoni* ova (4 of these were immigrants into the district, in which no *Biomphalaria* was found during snail survey), 4 stools showed *S. haematobium* ova.

Disability due to schistosomiasis was difficult to assess, largely because of concurrent infections, such as malaria and intestinal helminths. It is

probable that most if not all young persons are susceptible to infection. In communities in which infection is heavy in the early years of life there is evidence that a certain amount of immunity develops. Where opportunities for infection are scarce they tend to increase with age, and the highest incidence may be found in the over 40 age-group.

The distribution of snails is recorded on a map. The following species of *Bulinus* (*Physopsis*) were identified:—*B. nasutus*, *B. africanus ovoideus*, *B. globosus*. The last named is probably the chief vector of *S. haematobium*. Mozley [this *Bulletin*, 1940, v. 37, 483] found *B. globosus* closely associated with high incidence of *S. haematobium* in Tanganyika. *B. B. Waddy*

Mandahl-Barth, G. **Intermediate Hosts of** *Schistosoma*. **African** *Biomphalaria* **and** *Bulinus*: **I.** *Bull. World Health Organization*. Geneva. 1957, v. 16, No. 6, 1103–63, 37 figs. on 15 pls. & 17 text figs. [15 refs.]

———. **II.** *Ibid.*, v. 17, No. 1, 1–65, 23 figs. on 25 pls. & 8 text figs. [10 refs.]

"This study is an attempt to classify all described species of African *Biomphalaria* and *Bulinus*. It is based upon the author's examination of a great number of specimens collected from many parts of Africa. The variations attributable to age, environment and genetic factors which may be noted in the taxonomic characters are discussed, and some new species and subspecies are established. For each recognized species and subspecies the author states the distinguishing characters, indicates the geographical distribution, and gives a list of synonyms."

Marks, C. **The Surgical Pathology of Bilharziasis.** *South African Med. J.* 1958, Feb. 8, v. 32, No. 6, 162–6.

An address to the South African Medical Congress at Durban in September 1957. The main contents have already been published [this *Bulletin*, 1957, v. 54, 303].

Salem, H. H., Friedheim, E. A. H. & El Sherif, A. F. **The Treatment of Schistosomiasis by Antimony Dimercaptosuccinate (TWSb).** *J. Egyptian Pub. Health Ass.* 1957, v. 32, Nos. 7/8, 313–36, 1 chart.

This trivalent organic antimonial has already been reported to be an effective and non-toxic remedy for mansonian schistosomiasis [this *Bulletin*, 1955, v. 52, 56]. It also has been found to be therapeutically effective against *Trypanosoma congolense* and *T. brucei*, and against *Litomosoides carinii* infections in experimental animals when given in aqueous solution either intramuscularly or intravenously. It is 50 times less toxic to the mouse than tartar emetic.

For clinical use the drug is put up in phials containing 2 gm. of the anhydrous powder; this is dissolved in 20 cc. of fluid before use. It is given intravenously or, if veins cannot be reached, intramuscularly without special precautions. It can be used in an intensive 2-day course, or be given over a period of 5 to 10 days; 1 to 5 ml., according to age, are given daily to a total of 10–27 ml. of the solution. 163 patients with *Schistosoma haematobium* infections, and 20 with *S. mansoni* infections (7 with these eggs alone in the faeces; 13 with mixed infections with *S. haematobium*) were thus treated. Of these 183 patients 32 were 6–14 years old. Response to the drug was dramatic, ova disappearing from both urine and faeces in more than 90% of the cases within a month. Common side-effects were skin rashes persisting for not more than a week after treatment; in about 20% of the patients other more usual manifestations of antimony treatment were seen, but they were mild and transitory. The cure rate after a year was 96%. A feature of interest was a remarkable increase in the number of the dead eggs passed during treatment. A range of treatment schedules, and the response to these, is set out in tabular form. It seems that a 5- to 7-day treatment at 34 mgm./kgm. body weight for adults (a total of 20 ml.), and 40–60 mgm./kgm. for children (to a total not exceeding 16 ml.) give the best results. It therefore seems that TWSb is easy to give; the course of treatment is short; it is relatively non-toxic; and the cure rate is very high.

*A. R. D. Adams*

Alves, W. **Treatment of Urinary Bilharziasis with Antimony Dimercaptosuccinate (TWSb).** *Central African J. of Med.* 1958, Jan., v. 4, No. 1, 15.

"Twenty-five schoolboys weighing between 27 and 57 kg. were each given 0·4 gm. of TWSb (Antimony Dimercaptosuccinate) daily, by intravenous injection, for four consecutive days. They thus received 1·4 gm. TWSb irrespective of weight. The drug produced no objective symptoms of any kind; one boy complained of a bitter metallic taste after his third injection. They were treated as ambulant patients.

"Six weeks after treatment no eggs could be found in their urines."

Fraga de Azevedo, J., Carvão Gomes, F., Baptista, A. M. & Bragança Gil, F. **Studies on the Molluscocide Action of Copper Sulphate using $^{64}$Cu.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, No. 4, 458–64, 5 figs.

De Azevedo and his colleagues report further studies in the use of radio-active isotopes for the determination of the absorption of various elements by fresh-water molluscs and the distribution of these substances in the snail tissues. In the present series of experiments the radio-active isotope was $^{64}$Cu. The initial activity of the metallic copper was 1·1 C

with a half life of 12·80 hours. This was converted to copper sulphate, finally presented as a solution with a specific activity of 20 mC/ml. 3 experiments were performed. In experiments 1 and 2 the original copper sulphate solution of 20 mC activity was diluted with water to provide experimental solutions containing $^{64}$Cu and with activities of 1·0, 0·5, 0·25 mC/ml. and 4·0, 2·0 mC/ml. respectively. In experiment 3 sodium orthophosphate and sodium sulphate were added to separate flasks containing diluted copper sulphate solution. [The concentration of copper sulphate is not stated but from other data given it must be assumed to be 0·005 gm./ml. with activity of 1·0 mC/ml.]

The test snails were *Helisoma duryi normale*, *Planorbarius corneus*, *Planorbarius metidjensis*, *Biomphalaria pfeifferi* and *Australorbis glabratus*. In experiments 1 and 2, 8 snails were placed in flasks containing different concentrations of radio-active copper sulphate. In experiment 3 only *Helisoma duryi* was used. The activity of the snails was observed during the course of the experiment. All were dead within 18 hours in experiments 1 and 2 and were then fixed in 8% formaldehyde, sectioned, examined by autoradiography and counterstained with haemotoxylin and eosin. It was concluded that the snails absorbed copper from their environment, that copper diffused through the various tissues, that " general toxic action of copper on protoplasm " was observed and that sodium orthophosphate and sodium sulphate did not interfere with the molluscicidal activity of copper.

[Selected photomicrographs are given, showing the presence of $^{64}$Cu in tissues as demonstrated by autoradiography. It would have been of greater interest if the relative distribution of $^{64}$Cu through the tissues of *one* snail species had been described in detail rather than selections made from single organs of 5 species. In general, the paper lacks biological and histological detail.] *O. D. Standen*

CHERNIN, E. **Studies on the Control of Schistosome-Bearing Snails. VII. Streptomycin-Induced Inhibition of Growth and Reproduction in the Schistosome-Bearing Snail,** *Australorbis glabratus*. *Amer. J. Hyg.* 1957, Nov., v. 66, No. 3, 321–30, 3 figs.

" Evidence is presented which shows that small amounts of streptomycin inhibited the growth and reproduction of the schistosome snail vector, *Australorbis glabratus*, under ordinary aquarium conditions. The antibiotic was also found to have a ' residual ' toxicity for the snails which persisted for several weeks after the initial introduction of 50 to 100 micrograms per ml into aquarium water. The peculiar behavior exhibited by the snails when first exposed to streptomycin is described. The effects of certain inorganic salts and salt mixtures in preventing the appearance of this behavior, and in partially blocking the effects of the antibiotic on growth, are noted. It is suggested that streptomycin probably acts directly upon the snails rather than in some intermediary fashion, and

that its growth-inhibitory effects may be secondary to anorexia. This is believed to be the first report of streptomycin-induced inhibition of growth and reproduction in a metazoan species.''

Sakamoto, Y. [**An Epidemiologic Survey of Human Paragonimiasis in Kochi Prefecture**] *Shikoku Acta Med.* 1957, Nov., v. 11, No. 5, 560–71, 8 figs. [41 refs.] [In Japanese.] English summary.

The author studied some 31,000 schoolchildren in 66 schools of 37 districts in Kochi Prefecture, Japan, by means of an intradermal test with an antigen prepared from *Paragonimus westermani* obtained from dogs. The method of preparing the antigen is described.

586 (3·3%) of 17,735 elementary schoolchildren and 772 (6·3%) of 12,327 from middle schools were positive. About 1,000 of those who were positive had examinations of sputum or stools. Ova of *P. westermani* were found in 70 (15·9%) of 439 sputa examined and in 40 (4·2%) of 946 stools.

The principal focus was in the basin of the Niyodo River (central area) and the next was in the basin of the Shimanto River (western).

*H. J. O'D. Burke-Gaffney*

Lei, Hsüeh-Hsi & Yen, Chia-Kuei. **Pathologic Changes of Paragonimiasis. A Report of Five Cases.** *Chinese Med. J.* Peking. 1957, Dec., v. 75, No. 12, 986–1003, 10 figs. on 3 pls. [20 refs.]

5 fatal cases of paragonimiasis are described with full necropsy reports in this most interesting paper. All the patients had eaten raw or partly cooked crayfish. Abdominal symptoms appeared first in 2, followed in all by thoracic symptoms (chest pain, cough, rusty or bloody sputum), developing between the second and fifteenth month after exposure. Neurological symptoms developed between the ninth and twenty-fourth month. These included periods of loss of consciousness, dimness of vision, weakness of extremities with increased tendon jerks, convulsions and, in one case, symptoms of transverse myelitis (due to an extradural cyst).

Lesions attributable to the worm were found in the brain, lungs and pleurae, peritoneum, liver, spleen, kidney, perirenal tissue, omentum, and mesentery. In the patient with symptoms of myelitis there was a fistula in the psoas muscle connecting with the right twelfth intervertebral foramen, reaching to the extradural space, where the cord was softened. Lesions in the brain were found in the right occipital lobe, the temporal lobe, the lateral and third ventricles and choroid plexus, the pons, the basal ganglia, thalamus and in relation to the internal carotid artery. Adult worms were found in the lesions in 2 cases. Meningeal reaction was slight.

The pathogenesis of the lesions is briefly discussed. Three stages are seen: infiltrative, cyst formation and organization with or without calcification. The development of the pulmonary and cerebral lesions is considered in detail, and the author has attempted to correlate with the clinical and pathological picture the route of migration of the larvae from the intestinal tract to the lung and brain and that of the adult worm within these organs.

He concludes that the secretions of the larvae and the metabolites of the adult excite the host tissue responses, including peritoneal inflammation, exudative pleuritis, empyema, local abscess about the worm in the lung, liver and brain. Migration accounts for old and new cyst formation and fistulae. In the brain the worms "migrate in any direction by active penetration". Ova do not undergo embryonation; reaction to them is mild, with giant cell formation and lymphocytic and fibrotic infiltration.

A summary of the literature concerning paragonimiasis of the central nervous system is given. *B. G. Maegraith*

Borowska-Kuźmicka, J., Dzięciołowski, Z., Alejski, A. & Kuźmicki, R. Paragonimiaza płuc i próby jej leczenia wlewkami doodbytniczymi z alkoholu etylowego. [**Paragonimiasis of Lungs and Attempts to Treat it by Intrarectal Introduction of Ethyl Alcohol**] *Wiadomości Parazytologiczne*. Warsaw. 1957, v. 3, No. 6, 555–63, 4 figs. on 2 pls. [24 refs.] English summary.

The authors describe the treatment of 2 Korean patients suffering from pulmonary paragonimiasis. The first patient, a man aged 20, contracted the disease while fighting on the Korean front. The general condition improved during treatment with emetine and antibiotics, although the amount of sputum increased. Treatment by Grott's method (*Pol. Tyg. Lak.* [*Pol. Med. Wkly*], 1955, v. 9, 1569), consisting of enemata of 200 cc. of 7·5% aqueous ethanol twice daily, was carried out over a period of 10 days. The number and appearance of the eggs of the parasite in the sputum remained unchanged, and the treatment was discontinued. Considerable improvement resulted from a single intratracheal injection of 1·5 cc. of 1% emetine solution. The second patient, a man aged 19, who did not respond to treatment with emetine, was treated by Grott's method for 20 days. The general condition improved and intact eggs were no longer found in the sputum. *D. J. Bauer*

Deschiens, R. Les distomatoses hépatiques humaines en France. [**Human Hepatic Distomatosis in France**] *Ann. Inst. Pasteur*. 1958, Mar., v. 94, No. 3, 256–71, 1 map. [23 refs.]

The English summary appended to the paper is as follows:—

"Hepatic distomatosis is a parasitic disease due to the invasion of

biliary ducts by *Fasciola hepatica*. It is much more common than was formerly thought. Infections by the small fluke *Dicrocoelium dendriticum* are exceptional.

" The French regions where distomatosis prevails are situated at the south of the Loire. It is in the Lyonnais, the Dombes, the central mountainous and south-western regions that the disease is most often diagnosed.

" However human contaminations do exist at the north of the Loire, especially in Flanders, Lorraine, Franche-Comté, Normandy, Mayenne, Brittany.

" The author publishes a map representing the distribution of hepatic distomatosis in France. The main epidemics described from 1942 to 1957 are pointed out.

" The symptomatologic scheme of hepatic invasion, of the invasion of biliary ducts (generally two to three months later) by the parasite, and the different clinical pictures are described.

" A positive diagnosis is based, before the third month (e.g. before the appearance of the eggs):

" 1° On an hepatic febrile syndrome with a toxi-infectious condition;

" 2° On a high and unusual eosinophilia (the fever usually reduces eosinophilia);

" 3° On the cuti-reaction and particularly on the intradermal reaction with a Distoma antigen, and on the complement fixation reaction.

" After the appearance of eggs (third-fourth month) a stool examination allows, simultaneously with the intradermal reaction, demonstration of the infection.

" An early diagnosis of the disease (before the third month) is important, because the infection is then more easily curable than later.

" The best therapy is the administration of emetine chlorhydrate, the dosage being about the same as in amoebiasis.

" As prophylactic measures, the culture and sale of cress should be controlled, and water cress beds protected against contamination by cattle or wild animals."

Wray, J. R. **Note on Human Hydatid Disease in Kenya.** *East African Med. J.* 1958, Jan., v. 35, No. 1, 37–9. [12 refs.]

Ginsberg (*East African Med. J.*, 1956, v. 33, 297) recorded the incidence of hydatidosis in slaughter animals in Kenya and his figures of incidence are reproduced by the present author, who notes that there appears to be no record in the literature regarding the incidence of this disease in man in Kenya.

He now gives figures obtained from 12 African hospitals in Kenya and which relate to the years 1952–1955. The incidence varied between 20 cases in 1954 and 46 in 1955. The greatest incidence (30 cases for the

whole period) was in Kitale, and it is evident from the figures that the pastoral tribes, the Turkana and the Masai were most affected.

The cysts were mostly single and situated in the liver or mesentery. In one patient (a child of 10) there was a cyst the size of a walnut embedded in the thyroid, but it did not cause hyperthyroidism. In another patient the eyeball was enucleated for what was thought to be a retinoblastoma, but it proved to be a hydatid cyst [see also this *Bulletin*, 1955, v. 52, 1104]. The author has operated on 25 patients with hydatid cyst in the last 3 years.

The common host of this parasite in other countries is the dog, but the jackal and hyaena may carry it in Kenya. The important intermediate hosts are domestic slaughter animals and man. The author wonders whether the hydatid in Kenya slaughter animals is a type which can infect man. The incidence of 53% in sheep reported by Ginsberg (*loc. cit.*) and the analogous high incidence reported in man and in sheep in Italy [this *Bulletin*, 1955, v. 52, 803] would lead one to expect more cases in Africans.

The disease also does not appear to be recorded in dogs in Kenya and it may be that the local echinococcus has a predilection for jackals and hyaenas. The Masai tend to dispose of the dead in the open, so that the wilder animals could be infected from human corpses. A preference of the parasite for such wild animals would explain the high incidence in the primitive pastoral tribes.

Jackals and hyaenas foul the fields but do not come close to man: but the primitive pastoral tribesmen could be exposed from dirt and their habit of smearing themselves with earth.

Dogs, on the other hand, are numerous in Kenya and live close to man: if dogs were a main host, one would expect an infection rate in man at least as high as that in cattle and sheep; this would be expected particularly in children whose faces are often licked by dogs.

*H. J. O'D. Burke-Gaffney*

Moretti, G., Guignard, J. & Besse, P. Obturation complète de la veine cave inférieure et circulation collatérale cave-cave par un volumineux kyste hydatique du foie. [**Compression of the Inferior Vena Cava and Development of a Collateral Circulation by a Large Hydatid Cyst of the Liver**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 780–87. [34 refs.]

This paper presents an account of a large hydatid cyst of the right lobe of the liver and the symptoms it gave rise to by compression of the inferior vena cava. The blockage manifested itself by a *caput medusae* on the abdominal wall and a plexus of much enlarged superficial veins extending over the abdominal surface and thorax associated with hepatomegaly. There was no fever, icterus or ascites. The eosinophilia was 22% and there was a feebly positive Casoni reaction. It was considered necessary

to undertake a pneumoperitoneum, which gave further information. Unfortunately this procedure proved fatal. At autopsy numerous hydatid cysts the size of a small hen's egg were found free in the abdominal cavity. An enormous mass, of the capacity of a child's head, occupied the right lobe of the liver. The authors comment on the fact that a hydatid of this size compressing the vena cava thereby gave rise to a very considerable compensatory collateral circulation. *Philip Manson-Bahr*

DE MARIA, B. & ROSSI ESPAGNET, A. Osservazioni su alcuni focolai di anchilostomiasi individuati alla periferia di Roma. [**Observations on some Foci of Ankylostomiasis found at the Periphery of Rome**] *Ann. d. San. Pubblica.* Rome. 1957, Nov.–Dec., v. 18, No. 6, 1351–63, 2 maps. [10 refs.] English summary (8 lines).

After having pointed out that at the present time foci of ankylostomiasis exist in almost all the regions of Italy, but that so far as is known Latium seems to be among those less affected, the authors describe 4 small foci in the environs of Rome just outside the city limits. Each focus was related to a farm where the work was mainly the production of vegetables and fruit. The sanitary conditions were primitive and out of a total of 60 persons examined 39 (18 males and 21 females) were positive.

The farms were either contiguous or very close together and it is considered that people from the first farm infected the other 3 either directly or indirectly since the topography was such that liquid refuse from the first farm flowed down to the second. The inhabitants of the first farm, although probably infected before they resided there, followed a family who were also infected.

The authors are pessimistic regarding treatment as they point out that this must include simultaneous treatment of the patients and of the land, and in addition material improvements are needed in hygiene and sanitation. This cannot be done individually but must be undertaken by a higher body. Treatment of the patients was by tetrachlorethylene or a mixture of this and hexylresorcinol, with suitable supportive treatment for anaemia as required. *W. K. Dunscombe*

KAMARÝT, P. Výskyt onemocnění *Strongyloides stercoralis* v okrese Nové Mesto nad Váhom. [**The Occurrence of Disease from** *Strongyloides stercoralis*] *Časopis Lékařů Českých.* Prague. 1958, Feb. 28, v. 97, No. 9, 288–90, 4 figs.

The English summary appended to the paper is as follows:—

"The author [in Czechoslovakia] has observed a case of disease from Strongyloides stercoralis combined with duodenal ulcer in a 37 year old male. The entire family of four, and the majority of the other users of the same toilet as this patient, have larvae in their stools, without subjective complaints."

URABE, K. [**Human Experiment on Per-Cutaneous Infection of** *Ascaris*] *Igaku Kenkyu*. Fukuoka. 1957, Dec., v. 27, No. 12, 3267–71. [16 refs.] [In Japanese.] English summary.

It is generally held that *Ascaris* infection in man is brought about by oral ingestion of eggs containing mature larvae. The question has arisen whether hatched larvae can infect man. An experiment is referred to in which a volunteer infected himself orally with a hatched larva, and the present author, from Kyushu University, Japan, has tested on himself whether hatched *Ascaris* larvae can infect by the cutaneous route, as hookworm larvae do.

In the first two experiments, 100 artificially hatched larvae were smeared respectively on the web between two fingers and on the back of the hand. Erythema and papules subsequently appeared, but no ova appeared in the faeces. In a third experiment, 1,000 such larvae were smeared on the inner side of the forearm which had been slightly scarified beforehand. The same reaction, with severe itching, occurred and on the 79th day about 1,200 *Ascaris* eggs per gm. of faeces were found in the stools. All were unfertilized. The administration of an anthelmintic resulted in the excretion of one male and one female adult worm.

The author concludes that infection through the skin by *Ascaris* larvae can occur, if minute wounds are present. "But the probability of the occurrence seems very small." *H. J. O'D. Burke-Gaffney*

KIRK, R. **Acute Pancreatitis due to Ascariasis.** *J. Trop. Med. & Hyg.* 1958, Feb., v. 61, No. 2, 51–2. [12 refs.]

Ascariasis is one of the commonest helminthic infections in Singapore and has accounted for 25% of admissions of children to the General Hospital there [this *Bulletin*, 1949, v. 46, 761]. Autopsies on 1,350 children during 1939–1941 showed that 5·5% of children died from ascariasis and its many complications (several of which are mentioned).

Acute pancreatitis is a rare complication, but dramatic, usually fatal and with striking autopsy findings. A number of references are given [*ibid.*, 1934, v. 31, 390; 1948, v. 45, (723); 1952, v. 49, (1139)].

The present author records the case of a Chinese girl of 13 who was admitted to hospital with abdominal pain. She was known to have congenital heart disease and had been treated for it several times. On admission she was deeply cyanosed, the abdomen was tender and the liver and spleen palpable. The child died 2 days later.

Autopsy showed, in addition to the cardiac condition, blood stained peritoneal fluid and a large extravasation of blood around the duodenum and pancreas. The pancreas was swollen, haemorrhagic and dark red. A single worm, identified as *Ascaris lumbricoides*, was found in the intrapancreatic duct of Wirsung. The bile ducts were free and no worms were found elsewhere. All the abdominal organs were intensely congested.

In addition to causing obstruction in a duct, the worm may cause damage through its toxic products: pancreatitis has been demonstrated experimentally in dogs by the injection of *Ascaris* egg suspensions into the pancreas [*ibid.*, 1957, v. 54, 724]. *H. J. O'D. Burke-Gaffney*

See also p. 624, Griffith *et al.*, **Further Studies on Malaria in Krian with a Note on Filariasis.**

Galliard, H. Mortalité chez les Culicidés infestés par *Dirofilaria immitis* et *Wuchereria bancrofti*. [**Mortality in Mosquitoes Infected with *Dirofilaria immitis* and *Wuchereria bancrofti***] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, No. 4, 476–85, 3 figs. [19 refs.]

At 28°–31°C. the author has found that 36–90% of the mosquitoes infected with *Dirofilaria* die during the first 5 days after the blood meal, compared with 6–22·5% of the mosquitoes fed on uninfected hosts. The mosquitoes used were *Aëdes albopictus*, *Aëdes aegypti*, *Armigeres obturbans*, *Culex fatigans* and *Anopheles hyrcanus*. It is suggested that invasion of the Malpighian tubules by the parasite is responsible for the heavy mortality during the first 5 days, although at 18°–22°C. a comparable loss was not recorded in infected *Aëdes albopictus*. In mosquitoes infected with *Wuchereria*, where the parasite invades the thoracic muscles, and kept at 28°–31°C., only 7·5–50% died during the first 5 days after feeding. There was no evidence that migration of infective larvae, 10–25 days after feeding, to the head and proboscis of mosquitoes infected with either *Dirofilaria*, or *Wuchereria*, caused an increase in mortality at this time. The author also suggests that heavier infections with *Dirofilaria* result in greater mortality in the infected mosquitoes, and that unfertilized females are more resistant than fertilized females to infections with *Dirofilaria*. *B. R. Laurence*

Scott, J. A., Macdonald, Etta M. & Olson, L. J. **Attempts to produce Immunity against the Filarial Worms of Cotton Rats by Transfer of Developing Worms.** *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 70–73. [15 refs.]

"When fourth stage larvae or young adult worms of *Litomosoides carinii* are introduced surgically into the abdominal cavity of cotton rats, there is a retardation of growth and development of worms of a subsequent superimposed infection induced by subcutaneous introduction of infective larvae. This retardation is not so great, however, as when the primary infection is produced by subcutaneous introduction of infective larvae. Furthermore no effect is produced unless the number of fourth stage or

adult worms is considerably larger than the minimum number of infective larvae required to produce this effect."

Pacheco Sanchez, S. & Ruiz Reyes, F. Analgésico de síntesis como auxiliar en el tratamiento médico de la oncocercosis. [**A Synthetic Analgesic as a Supplementary Treatment in the Therapy of Onchocerciasis**] *Bol. Epidemiológico.* Mexico. 1957, Apr.–May–June, v. 21, No. 2, 48–9.

During the treatment of onchocerciasis with diethylcarbamazine, patients are liable to suffer from allergic reactions such as pruritus, oedema of the face and arms, conjunctivitis and other undesirable side effects. Antihistaminic drugs are often disappointing in such cases, and the authors, in Mexico, sought other drugs which might prevent or allay these reactions. They describe trials with a synthetic analgesic drug, Magnopyrol (Siegfried Laboratories, Switzerland), which is an antipyrin derivative. The salt is of high molecular weight and is said to be of low toxicity. The oral dose is up to 5 gm. daily and the parenteral dose is 1–2 gm. Tablets for oral use are of 500 mgm. and ampoules are of 2 gm.

The authors selected patients with heavy microfilarial densities in the skin. 85 were treated with diethylcarbamazine supplemented with Magnopyrol.

The results are shown in a table. The dosage of diethylcarbamazine was 5 mgm./kgm. twice on the first day and once on the second: for the next 3 days a single dose of 2 mgm./kgm. was given daily.

When the first sign of reactions appeared, the patient was given 1 ampoule of Magnopyrol intravenously, followed later in the day by an oral maintenance dose of 2–4 tablets. There was an immediate diminution of the reactions and the patients, who would otherwise have been obliged to rest from work, were able to continue their occupation. On the second day 4–6 tablets of Magnopyrol were given by mouth and the reactions were still less intense: the patients could now sleep and eat in comfort. On the third day, except for mild pruritus and oedema, the allergic reactions had ceased: 2–4 tablets were given and the recession was usually complete. By the fourth day it was possible to continue the specific treatment for onchocerciasis without further anxiety. The authors showed, by means of skin biopsies, that the analgesic drug did not lessen the microfilaricidal action of the diethylcarbamazine.

In general, they consider that, in practice, it is preferable to use the oral treatment and to reserve the use of intravenous Magnopyrol for very severe cases and then only under strict medical supervision.

While they admit that these reactions to diethylcarbamazine are relieved in varying degrees by antihistaminics and in any case are likely to disappear spontaneously within 5 days, the authors make the point

that the use of Magnopyrol in these cases lessened the reaction more quickly, allowed the patients to continue their normal occupations and removed the fear of continued treatment with diethylcarbamazine which these reactions tended to arouse.

[The dosages of Magnopyrol given in the tables do not seem to correspond with those in the text which are, in general, lower than some of those quoted above.] *H. J. O'D. Burke-Gaffney*

Hill, B. H. R. **An Acute Urticarial Reaction to Piperazine Citrate.** *New Zealand Med. J.* 1957, Oct., v. 56, No. 315, 572.

Piperazine citrate is said to have no significant toxic manifestations when it is given in the recommended dosage of 50–75 mgm./kgm. body weight, but neurological manifestations have been reported when a dosage up to three times the normal has been given [this *Bulletin*, 1954, v. 51, 86, 423; 1956, v. 53, 643].

The author refers to a study of Ratner *et al.* (*Ann. Allergy*, 1955, v. 13, 176) who investigated 27 patients in whom allergic dermal reactions were reported from the use of piperazine citrate; in 8 there were insufficient data, 11 had symptoms apparently unrelated to the drug, and 8 had a reaction which appeared to resemble serum sickness.

He quotes Ratner *et al.* as stating " serum sickness like reactions do not usually occur from the use of a particular drug. They may be accounted for by the concurrent invasion of antigenic substances other than the drug used, a common occurrence during childhood ". Those authors carried out controlled experiments in guineapigs to determine whether piperazine citrate was anaphylactigenic; no generalized or dermal reactions were noted from the use of the syrup.

The present author, from Napier, New Zealand, now reports the case of a child of 5, weighing 18 kgm., who had no family history of allergy and no previous illnesses, but who was diagnosed as suffering from *Enterobius* infection. He was given 1,000 mgm. of piperazine citrate daily in the form of Antepar Elixir, for 7 days without ill effects. Three months later a further *Enterobius* infection was noticed and a second course of 1,000 mgm. daily (500 mgm. night and morning) was begun. Next day large irritable urticarial erythematous swellings appeared on the face, eyelids and penis, and smaller wheals on the trunk and legs. The drug was stopped, but the swelling and irritation increased during the next 2 days and gross oedema occurred about the eyes, genitalia and legs. The child remained apyrexial but drowsy: no joint manifestations or affection of other systems were observed. In the next 2 days, the oedema and irritation gradually subsided and the child was given tripolidine hydrochlorate and ephedrine.

The reaction was evidently allergenic in nature. The author quotes the manufacturers as claiming that " side effects occur mainly in adults, have

chiefly been mild, ceasing rapidly on discontinuation of the drug, and overdosage is believed to have been the chief cause of these reactions, and they may be avoided by appropriate adjustment of the dose given ".

*H. J. O'D. Burke-Gaffney*

DE CARNERI, I. Mantenimento di un alto livello di infestazione da *Syphacia obvelata*; *Aspiculuris tetraptera* e *Hymenolepis nana* var. *fraterna* in una colonia di topi utilizzati per prove antielmintiche. [**Maintenance of a High Level of Infection of** *Syphacia obvelata*, *Aspiculuris tetraptera* **and** *Hymenolepis nana* **var.** *fraterna* **in a Colony of Mice used for Anthelmintic Tests**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1957, Dec., v. 38, No. 12, 641–54, 7 figs. [52 refs.]

The English summary appended to the paper is as follows:—

"The biological cycles of *Hymenolepis nana* var. *fraterna*, *Syphacia obvelata* and *Aspiculuris tetraptera*, intestinal helminths of mice, are summarized. Some photographs of the three helminths and their eggs are also included. A method is described for obtaining a high level of infection. To this purpose about 100 young mice are kept along with 10 infected adults. The bibliography (52 references) regarding the use of these infections for testing anthelmintic drugs is reviewed."

REINHARD, E. G. **Landmarks of Parasitology. II. Demonstration of the Life Cycle and Pathogenicity of the Spiral Threadworm.** *Exper. Parasit.* New York. 1958, Jan., v. 7, No. 1, 108–23, 4 figs. on 4 pls. [36 refs.]

HANKES, L. V. & STONER, R. D. **Incorporation of DL-Tyrosine-2-C-14 and DL-Tryptophan-2-C-14 by encysted** *Trichinella spiralis* **Larvae.** *Exper. Parasit.* New York. 1958, Jan., v. 7, No. 1, 92–8.

[See this *Bulletin*, 1956, v. 53, (355).]

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## DEFICIENCY DISEASES

JANZ, A. J., DEMREYER, E. M. & CLOSE, T. **Nutrition and Lactation in Woman with particular reference to Under-Nutrition in the Under-Developed Countries.** *West African J. Biol. Chem.* London. 1957, July–Sept. & Oct.–Dec., v. 1, Nos. 2 & 3, 49–60 & 88–106. [Numerous refs.]

The authors quote a large number of articles on the estimation of the quantities and components of human milk from different countries. They

point out the wide variations at the early stages of lactation, the individual and diurnal variations, and the difficulty of obtaining comparable figures.

As far as the major components are concerned they conclude that even a large reduction in the food intake only affects in a limited manner the concentration of most of the components elaborated by the mammary gland. A restricted food supply will, however, reduce the quantity of the secretion, and the duration of lactation. A diet that is very low in protein will result in milk that has only a slight reduction in nitrogenous content. They quote evidence to show that the glucose intake may have considerable effect on the elaboration of fatty acids.

The vitamin content of the milk, on the other hand, is definitely affected by the food intake. Vitamin A is often found to be reduced, and so is thiamine. The other components of the B complex have not been accurately studied. Vitamin C is stored to such an extent that breast-fed babies rarely suffer from scurvy. With respect to vitamin D they have no conclusive evidence. On the whole it seems that vitamins given to the mother rapidly pass into the milk, but the size of the response is far from being proportionate to the ration.

In the second article the composition and functions of the proteins, fats and carbohydrate in milk are discussed.

In considering the composition of mothers' milk in the "under-developed" countries they emphasize the importance of "request" feeding. In spite of nearly all tropical diets being reputedly low in animal protein there is very little difference in the average protein content of human milk between the various countries. Holemans *et al.* (*Rev. Med. Liège*, 1954, v. 9, 23; 714), in the Belgian Congo, have, however, succeeded in increasing the protein content of the milk, and the total production, by feeding the mothers of a particularly backward area on rations of skimmed milk powder. The lactose content of human milk appears to be very stable while the fatty acids depend largely on the methods used for sampling the milk, and are almost impossible to compare.

The calcium content of human milk is somewhat lower, in the under-developed areas but the phosphorus content is about the same as that found in Europe and America.

The authors review the arguments for and against breast feeding. They conclude that in the under-developed regions every effort must be made to encourage breast feeding and that by improving the mother's diet the quantity, quality and duration of lactation can be benefited.

[This article is an excellent summary of useful information. The evidence that the authors quote to show that breast-fed babies are better off, and also more resistant to disease than the artificially fed would not be universally accepted, as much has been done of recent years to improve the technique of artificial feeding. It is perfectly true, however, that in most of the under-developed regions artificial feeding is still a deadly menace. They maintain that breast feeding may be difficult or impossible

where the mother goes out to work. This is not necessarily true. In many places where the mother is working in the fields most of the day, the baby will feed 3 or 4 times during the night, apparently with little inconvenience to either the mother or child.] *Cicely D. Williams*

Subrahmanyan, V., Joseph, Kantha, Doraiswamy, T. R., Narayanarao, M., Sankaran, A. N. & Swaminathan, M. **The Effect of a Supplementary Multipurpose Food on the Growth and Nutritional Status of Schoolchildren.** *Brit. J. Nutrition.* 1957, v. 11, No. 4, 382–8. [21 refs.]

The multipurpose food consisted of groundnut flour and Bengal-gram flour enriched with vitamins and calcium phosphate. 46 girls between the ages of 4 and 12 years in an orphanage were observed for 5 months. The girls were paired: half of them received a supplement of 2 oz. of the multipurpose food daily and the other half were given maize starch and cane sugar to the same calorie value. The total ration amounted to 1,190 calories (2,000 calories is recommended for these age-groups by the Indian Council of Medical Research).

The girls on the multipurpose food supplement showed slightly better growth and haemoglobin values, and a definitely higher increase in the red blood cells than the control group. 18 children in the experimental group improved in nutritional status, but none of the control group did. 13 children in the control group showed deterioration whereas none did on the multipurpose food supplement. *Cicely D. Williams*

Joseph, Kantha, Narayanarao, M., Swaminathan, M. & Subrahmanyan, V. **The Metabolism of Nitrogen, Calcium and Phosphorus in Undernourished Children. 3. The Effect of a Supplementary Multipurpose Food on the Metabolism of Nitrogen, Calcium and Phosphorus.** *Brit. J. Nutrition.* 1957, v. 11, No. 4, 388–91.

". . . Undernourished children subsisting on an inadequate and ill-balanced vegetarian diet grew at a subnormal rate, but showed a remarkable adaptation to low levels of intake, maintaining on average slightly positive nitrogen, calcium and phosphorus balances" [this *Bulletin*, 1955, v. 52, (1218)].

Five pairs of girls aged 8–11 years were studied for 5 days. One group received an additional 2 oz. of multipurpose food made of groundnut flour, Bengal-gram flour with added vitamins and calcium phosphate. The others, on a poor vegetarian diet, acted as controls. The addition of this food resulted in a significant increase in the retention of nitrogen, calcium and phosphorus even though the total calorie intake was only 1,060 calories. *Cicely D. Williams*

Grusin, H. & Samuel, E. **A Syndrome of Osteoporosis in Africans and its Relationship to Scurvy.** *Amer. J. Clin. Nutrition.* 1957, Nov.–Dec., v. 5, No. 6, 644–50, 1 fig. [28 refs.]

"The clinical, radiologic and laboratory features of 16 cases of osteoporosis in Africans are described and postmortem findings in two cases are included. Nine patients were suffering from classic acute scurvy on admission and one from a possible scorbutic equivalent. A theory is propounded that chronic vitamin C deficiency may be responsible for osteoporosis in this community. Among these patients there was a high incidence of hemosiderosis, portal fibrosis, disturbed liver function tests, and abnormal serum proteins. Reasons are given why these factors are not considered to be causally related to the osteoporosis."

[The authors state that therapeutic trials with ascorbic acid yielded inconclusive results. Some of the signs described appear to be not unlike those of erythema nodosum.] *Cicely D. Williams*

Ruskin, H., Cohn, T. D., Bloomberg, B. M. & Greenblatt, I. J. **Serum Betalipoprotein Studies in the South African Bantu.** *Amer. J. Med. Sci.* 1958, Feb., v. 235, No. 2, 138–42. [17 refs.]

"1. The adult male and female South African Bantu exhibit levels of serum betalipoproteins of the $S_f$ 12–100 classes which are significantly lower than those of 'clinically healthy' white New York City individuals.

"2. These findings may be related to the Bantu dietary."

Patel, B. D., Jadhav, M., Gaitonde, B. B. & Rao, G. S. **Paper Electrophoresis of Serum Proteins in Protein Malnutrition.** *J. of J.J. Group Hosps. & Grant Med. College.* Bombay. 1958, Jan., v. 3, No. 1, 40–43.

The authors have examined by paper electrophoresis the serum proteins of 10 normal children and of 37 children with protein malnutrition whose ages ranged from 7 months to 6 years. Of the malnourished children, 14 were mildly, 11 more severely and 12 very severely, affected. All of them were oedematous, they had skin and hair changes and showed other signs of vitamin deficiency. The food intake was of low caloric value, none of them having received an adequate amount of milk. Thus a poor nutritional intake was the salient feature. The serum albumin level was $3{\cdot}4 \pm 0{\cdot}24$ gm. in the normal children, and in the three groups of abnormal children in order of increasing severity of the oedema it was $1{\cdot}94 \pm 0{\cdot}09$, $1{\cdot}62 \pm 0{\cdot}78$, and $1{\cdot}30 \pm 0{\cdot}39$ gm.%

The authors state that there was a tendency of the alpha globulin to rise with increasing severity of malnutrition but as far as the abstracter can make out this does not seem to be borne out by their figures. It

seems that the gamma globulin was slightly higher in the malnourished children than in the normal children and that the beta globulin was somewhat lower. Although there was a correlation between low albumin level and severity of oedema, this correlation was not absolute and there were some children with a very low albumin level and only slight oedema, whereas others had a higher albumin with more severe oedema.

[In a future investigation it would be worth finding out whether the absence of severe oedema in children with very low albumin level was associated with a salt deficiency. Experience with prisoners of war returned to India from Japanese camps might be of interest. Some of them only developed oedema after a few days of stay in hospital when, as it were, sufficient salt had been received to allow an expansion of the sodium space, *i.e.*, of the plasma and the extracellular fluid.]

*H. Lehmann*

Mukherjee, K. L. & Sarkar, N. K. **Liver Enzymes in Human Undernutrition.** *Brit. J. Nutrition.* 1958, v. 12, No. 1, 1–7. [38 refs.]

" 1. Twelve patients suffering from nutritional oedema and seven babies with kwashiorkor were subjected to liver biopsy on admission to hospital and after recovery. Liver nitrogen content, catalase activity, iron content and cholinesterase and alkaline-phosphatase activity were determined.

" 2. The liver-nitrogen concentrations were low on admission and higher after recovery.

" 3. The catalase activity of the liver amounted to 3·6 ml. $O_2$/mg N/sec on admission and to 1·6 ml. $O_2$/mg N/sec after recovery. The liver iron at the same time decreased from an initial value of 46 mg/100 g to 17 mg/100 g. There was a definite correlation between liver iron content and catalase activity.

" 4. There was a 70% reduction of liver cholinesterase activity on admission compared with the value after recovery.

" 5. The liver alkaline-phosphatase activity was 200% higher on admission than after recovery."

Thomson, F. A. **Kwashiorkor in Malaya.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, Jan., v. 52, No. 1, 91.

Waterlow and Scrimshaw [this *Bulletin*, 1957, v. 54, 1223] suggested that reports of " pre-kwashiorkor " should contain a frequency table of the various changes seen, so that the true picture of protein deficiency in an area might be obtained. In continuation of studies on kwashiorkor in Malaya [*ibid.*, 1954, v. 51, 828] the author has completed further work in Perak and gives such figures which are part of a survey yet to be completed.

One toddler was selected at random for examination in each of 50 households in 4 areas on the banks of the Perak River. Pre-kwashiorkor was

recorded if clinical signs of protein deficiency were present but the picture was not severe enough to justify a diagnosis of kwashiorkor. All those diagnosed as kwashiorkor showed the classical signs. The findings were as follows:—

| No. examined | Eye signs | Tooth decay | Skin changes | Enlargement liver | Enlargement spleen | Hair changes | Oedema | Kwashiorkor | Pre-kwashiorkor |
|---|---|---|---|---|---|---|---|---|---|
| 200 | 191 | 106 | 185 | 57 | 7 | 113 | 69 | 38 | 50 |

When pre-kwashiorkor and kwashiorkor were taken together, 44% of children were seen to have evidence of more or less serious protein deprivation. Visits to other parts of Malaya have shown that there was evidence of protein deficiency everywhere, though the incidence of classical kwashiorkor varied from place to place. Further studies are in progress.

*H. J. O'D. Burke-Gaffney*

Srikantia, S. G., Sriramachari, S. & Gopalan, C. **A Follow-Up Study of Fifteen Cases of "Kwashiorkor".** *Indian J. Med. Res.* 1958, Jan., v. 46, No. 1, 121–8, 6 figs. on pl. [19 refs.]

It is related that 15 children between the ages of 2 and 10 years formed the subjects of the investigation and all had suffered from kwashiorkor at periods ranging from 9 months to 8 years before the present study. [A statement of the age at onset of the disease and the follow-up period in each case would have been welcome and more helpful in assessment of the results.]

Only 6 of the children were significantly below comparable age-group local averages for height and weight, but these averages were lower than accepted Western standards. 9 had prominence of the cheeks ("moon face"), 11 had skin changes including follicular hyperkeratosis, 5 had hair changes (not described) and the liver was clinically enlarged in 2. Total serum protein values were within normal limits but the globulin content was raised in 4 children, in 3 of whom the albumin was low. Figures for total serum cholesterol and the ester fraction were in agreement with local normal values [this *Bulletin*, 1956, v. 53, 482] but generally higher than in Western children. Haematological studies, including red cell count, packed cell volume, and haemoglobin determinations, were carried out but no results are provided or discussed. Dietary intake of protein, on an age and expected weight basis, was judged inadequate in most cases. Despite return to protein-deficient diets after discharge from hospital and treatment of the original episode of kwashiorkor, only 2 of the 15 children had a history of relapse. The authors believe that this supports the view that dietary inadequacy of protein may not be the sole determinant in the development of kwashiorkor and that superimposed stresses such as acute infective disorders are probably important.

Liver biopsies were performed and 6 examples of the liver sections obtained are displayed. An important finding was that none of the cases revealed evidence of hepatic fibrosis. Histologically normal liver tissue was obtained from 3 children. The other 12 showed cytoplasmic vacuolation of the parenchymal cells. The vacuolation was not attributable to fat or glycogen and was presumed to represent protein deficiency [*ibid.*, 1955, v. 52, 77]. In 2 cases it disappeared after an intervening period of protein therapy. In some sections the histochemical reaction for alkaline phosphatase was increased, and 3 showed small periportal clusters of mesenchymal cells.

The results of the investigation are interpreted as reflecting current dietary inadequacies rather than residual effects of kwashiorkor.

*C. S. Leithead*

MENDES, C. B. & WATERLOW, J. C. **The Effect of a Low-Protein Diet, and of Refeeding, on the Composition of Liver and Muscle in the Weanling Rat.** *Brit. J. Nutrition.* 1958, v. 12, No. 1, 74–88, 8 figs. [30 refs.]

" 1. Fifty-six weanling rats were fed on a low-protein, high-carbohydrate diet designed to simulate that eaten by poor people in Jamaica. After 4 weeks one group was killed and the remainder were rehabilitated on a stock diet containing 18% protein.

" 2. Measurements were made of the protein and deoxyribonucleic-acid content of liver and muscle at the end of the depletion period, at various times during recovery, and also in control animals growing normally.

" 3. The ' Jamaican ' diet caused a virtually complete arrest of growth. Body-weight, liver weight and muscle weight remained constant at the levels reached on weaning. The ratio of nitrogen to DNA was greatly reduced in both liver and muscle. In muscle this reduction occurred entirely at the expense of cellular protein. The connective tissue of muscle continued to increase in amount throughout the depletion period.

" 4. On refeeding there was a rapid formation of new protein and DNA in the liver, at about twice the rate that obtains during normal growth. In muscle, on the other hand, there was evidence of a lag period before the synthesis of new tissue reached its maximum rate.

" 5. The bearing of these results on the assessment and treatment of protein malnutrition in human infants is discussed. They tend to support the suggestion previously put forward, that the ratio of non-collagen nitrogen to DNA in muscle may be a useful index of the degree of protein depletion."

[See this *Bulletin*, 1957, v. 54, 77, 743.]

## SPRUE

French, J. M., Hawkins, C. F. & Smith, Nadya. **The Effect of a Wheat-Gluten-Free Diet in Adult Idiopathic Steatorrhoea. A Study of 22 Cases.** *Quart. J. Med.* (n.s.) 1957, Oct., v. 26, No. 104, 481–99, 11 figs. [34 refs.]

22 patients were studied. They had all complained of ill-health for years with symptoms including flatulence, persistent loose, pale stools, episodes of sore mouth, tongue, anorexia, asthenia and loss of weight. Fat excretion was abnormal (more than 5 gm. per day); duodenal juice was normal; most patients had delayed or reduced oral glucose absorption; anaemia was present, macrocytic or hypochromic; bone-marrow showed megaloblasts in 2 cases; there was small intestinal flocculation of ordinary barium suspension.

All wheat and rye gluten was excluded from the diet, and disappearance of clinical symptoms was noted over a subsequent period of weeks and years, including periods of deliberate re-introduction of wheat gluten.

16 patients recovered completely. 10 of these were investigated subsequently and only 1 has so far relapsed a year after recovery.

5 patients relapsed when given gluten-containing food during observation. Withdrawal of gluten was followed by recovery.

6 failed to respond.

The authors conclude that wheat gluten is usually the basic cause of idiopathic steatorrhoea. A favourable response to withdrawal of gluten is slower than in children with coeliac disease. Once recovery has taken place the gluten-free diet must be maintained indefinitely.

Referring to "tropical sprue" the authors state: "patients with tropical sprue who fail to improve after treatment for a short period in a temperate climate must be regarded as potential sufferers from idiopathic steatorrhoea, who have happened to be in the tropics at the time of the onset of the illness". [These are words to be remembered.]

*B. G. Maegraith*

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## HAEMATOLOGY

Foy, H. & Kondi, Athena. **Anaemias of the Tropics: East Africa, with special reference to Proteins and Liver Damage.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, Jan., v. 52, No. 1, 46–70, 2 figs. [56 refs.]

The authors have examined at the King George VI Hospital, Nairobi, 85 subjects with severe anaemia, all with a haemoglobin level below 8·5 gm. per 100 ml. 33 of the anaemias were megaloblastic, 24 were

iron deficient and 28 were a collection of miscellaneous conditions such as haemolysis due to hypersplenism, and secondary anaemia due to bleeding ulcers and infections. For the purpose of the present investigation, the authors concentrated on the first two groups and in the third group only on patients with splenic haemolysis. The patients came from areas varying in altitudes from 3,000 to 6,000 feet. This explains, according to the authors, why there was such a high proportion of megaloblastic anaemias. In the higher and cooler regions megaloblastic anaemias are commoner although iron deficiency anaemias occur as well. In the damp coastal areas iron deficiency anaemia is predominant.

In the present investigation the main purpose was to assess the importance of the serum protein level in the diagnosis of severe anaemia and to investigate whether there was a relationship between variations of protein pattern and the state of nutrition and the type and severity of the anaemia. It was found that the serum protein pattern in the anaemias was unspecific. In some patients with severe anaemia the serum protein was higher than in less anaemic patients and the albumin/globulin ratio was less abnormal. [It would be interesting in a future investigation to correlate these differences with the plasma volume and to see whether in fact the total circulating serum protein was more in quantity in these anaemia patients.] Furthermore, in protein deficiency diseases such as marasmus and kwashiorkor severe anaemia was rare. It certainly was not the presenting symptom and if anaemia was present mere protein supplements could not cure it unless the appropriate specific haematinic was also given.

In addition to an investigation of the serum proteins the authors have performed liver biopsies on 8 patients. There was no constant histological picture associated with a given type of anaemia and there was no association between the appearance of the liver and the severity of the anaemia or its response to treatment.

The results are set out at length in 11 tables, 2 figures and an appendix.

*H. Lehmann*

Foy, H., Kondi, Athena & Sarma, B. **Anaemias of the Tropics, India and Ceylon.** *J. Trop. Med. & Hyg.* 1958, Feb., v. 61, No. 2, 27–47, 1 map & 1 fig. [Numerous refs.]

The authors have investigated anaemia in a variety of places in India and Ceylon: Nilgiri Hills, Darjeeling, Assam, Colombo. A haemoglobin survey was made of 4,090 men and women between the ages of 15 and 40 from the working rural population. The mean haemoglobin level was 11·5 gm.%, and 14% of these 4,090 people had a haemoglobin level below 8 gm.%. 96 people all with haemoglobins below 7 gm.%, in whom the anaemia was the presenting symptom, were fully investigated. 85 were women and 11 were men. 82 anaemias were of the iron deficiency type and 14 were megaloblastic.

The megaloblastic anaemias were typical and responded to vitamin B12 or folic acid, although some iron was required for a complete cure. The iron deficient group consisted mostly of women. The bone-marrows were erythronormoblastic and in about half of them giant stab cells were found. All these patients at first showed an improvement on treatment with iron by mouth, but when giant stab cells were present there was also a need for folic acid.

Much of the paper is devoted to a discussion of the causes of iron deficiency in these patients. There is no shortage of iron in tropical diets but absorption is considered to be poor on account of the type of diet and the authors consider the loss of iron by desquamation of the skin in a hot climate as an important contributory factor. There may also be high intestinal mucosal losses. Hookworms may play a part in causing iron deficiency but the authors do not consider that their role is paramount.

The findings are set out fully in 11 tables and a figure.

*H. Lehmann*

Tasker, P. W. G. **The Diagnosis of Nutritional Megaloblastic Anaemia: the Use of Bone Marrow Biopsy.** *Med. J. Malaya.* 1957, Dec., v. 12, No. 2, 395–405, 11 figs.

"Details for the performance of an iliac crest bone marrow biopsy, the staining of marrow smears, and the diagnosis of a megaloblastic anaemia from the appearance of these smears are given. These are presented for the use of those interested in diagnosing as accurately as possible the presence of a megaloblastic anaemia."

Chatterjea, J. B., Ghosh, S. K., Ray, R. N., Basu, A. K. & Banerjee, D. K. **Serum Iron Changes in Nutritional Macrocytic Anemia during Erythrocytic Response with Antimegaloblastic Drugs. Early Drop in Serum Iron as an Index of Erythropoietic Response.** *Indian J. Med. Sci.* 1957, Aug., v. 11, No. 8, 565–9, 1 fig.

In India it has been found that in uncomplicated nutritional macrocytic (megaloblastic) anaemia, serum iron is normal or high, the iron binding capacity is depressed and bone-marrow haemosiderin is greatly increased. These values, however, return to normal after successful therapy with antimegaloblastic substances. Further observation of serum iron levels in these cases during treatment was prompted by the accidental observation of hypoferraemia 2–3 days after the institution of specific therapy in 2 patients. Such observations were made in 12 patients. In 10 there was satisfactory haematological and clinical improvement, and in all of these 10 patients there was an initial drop in the serum iron level which in 8 later reached a normal value. In the remaining 2 patients serum iron was not only initially low but remained so throughout treatment and administration of iron was required.

It is suggested that the fall in the serum iron values may be the earliest index of satisfactory erythropoietic response, being presumably due to rapid utilization of circulatory iron for erythropoiesis. Circulatory iron appears to be much more rapidly utilized than that from the tissue stores. *A. W. Woodruff*

Metz, J., Cassel, R. & Lewis, S. M. **Pernicious Anaemia in the South African Bantu. Report of Ten Cases.** *South African Med. J.* 1958, Feb. 15, v. 32, No. 7, 190–93, 1 fig. [10 refs.]

"Nine cases of pernicious anaemia in the South African Bantu were diagnosed by study of the absorption of radio-active vitamin B12. A further case of megaloblastic anaemia is described, showing the histological changes in the gastric mucosa consistent with the diagnosis of pernicious anaemia."

Paterson, J. C. S. & Sprague, C. C. **Perspectives of Sickle-Cell Disease.** *J. Trop. Pediatrics.* London. 1958, Mar., v. 3, No. 4, 147–56. [Numerous refs.]

A review of the literature and discussion.

Languillon, J. Note sur la présence d'hémoglobines anormales chez les Bantous du Sud-Cameroun. [**Presence of Abnormal Haemoglobin in the Bantu in Southern French Cameroons**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 726–8.

[See this *Bulletin*, 1958, v. 55, 568.]

Greenberg, M. S. & Kass, E. H. **Studies on the Destruction of Red Blood Cells. XIII. Observations on the Role of pH in the Pathogenesis and Treatment of Painful Crisis in Sickle-Cell Disease.** *Arch. Intern. Med.* 1958, Feb., v. 101, No. 2, 355–63, 6 figs. [22 refs.]

The chronic haemolytic anaemia of sickle-cell disease arises from the diminished life span of the erythrocytes and the increased mechanical fragility of sickled cells. The painful crises have been related to the increased viscosity of the blood when it contains cells in sickle shape [this *Bulletin*, 1956, v. 53, 919]. The slower blood flow of the more viscous blood causes local hypoxia which in turn causes more sickling. This paper deals with yet another factor which may augment sickling *in vivo*. *In vitro* observations show that lowering the *p*H of sickle-cell blood will increase the degree of sickling. Few, if any, red cells from

patients with sickle-cell anaemia were seen to be in the sickled form at *p*H 7·5 and a partial oxygen pressure of 60 mm. Hg, but 90% of the cells were sickled when the same blood at the same oxygen tension was at *p*H 7·0.

The observations presented in this paper demonstrate that induced acidosis may precipitate painful crises in patients with sickle-cell disease and that the administration of alkali may then be of benefit in the treatment of these crises. Metabolic acidosis was produced on two different occasions in a sickle-cell anaemia patient by giving ammonium chloride and acetazolamide. With the fall of the blood *p*H crises ensued. The drugs were stopped and with the rise of the blood *p*H the crises ended. It is noteworthy that in 6 instances when patients were admitted with painful sickle-cell crises, on 4 occasions the administration of sodium bicarbonate produced relief of the symptoms. The inference is that acidosis may be a more common cause of sickle-cell crises than has hitherto been assumed. *H. Lehmann*

Carroll, D. S. **Roentgen Manifestations of Sickle Cell Disease.** *Southern Med. J.* 1957, Dec., v. 50, No. 12, 1486–90, 5 figs.

The author reviews the radiological findings in 124 cases of " sickle cell disease " seen over the last decade. [Haematological details, including haemoglobin patterns, are not given.]

Radiological changes in bone were of two main types resulting from two processes arising from hypoxia, *viz.*: marrow hyperplasia and thrombosis. Hyperplastic marrow was manifested by decalcification of bone, thinning of the cortex and widening of the medullary cavity with or without coarsening of the architecture. Thrombotic changes resulted in cortical thickening, narrowing of the medullary cavity and coarsening of the architecture. Single or localized thrombosis caused " bizarre radiolucent " or densely calcified areas.

Hyperplastic marrow effects were seen mostly in the spine, the ribs, and the pelvis. In the skull the commonest finding was a simple increase in prominence of the diploic markings, especially in the posterior parietal areas. Thickening of the calvarium was present in 20 patients. Perpendicular striation was present in 7. 9 had multiple rounded areas of decalcification.

Changes of thrombotic origin were seen in the long bones in half the patients. An epiphysis was frequently involved. Aseptic necrosis of the capital femoral epiphysis was seen, for instance, in 9 patients. Centres of ossification of vertebrae, the humerus and the patella were also noted. Dactylitis, involving hands and feet, was observed in 7 children with periosteal proliferation of the shafts of several (but never all) metatarsal, metacarpal, and phalangeal bones, and cyst-like areas of destruction. 4 patients had associated *Salmonella* osteomyelitis. *B. G. Maegraith*

Carrington, H. T., Ferguson, Angella D. & Scott, R. B. **Studies in Sickle-Cell Anemia. XI. Bone Involvement simulating Aseptic Necrosis.** *J. Dis. Children.* Chicago. 1958, Feb., v. 95, No. 2, 157–63, 5 figs. [40 refs.]

"Two cases of aseptic necrosis of bone in children with sickle-cell anemia are presented. This osseous lesion probably follows thrombosis of the blood vessels supplying the affected area. Involvement of the femoral neck and head may produce pathology indistinguishable from classical Legg-Perthes disease. Therapy is based mainly on orthopedic care. The prognosis varies with the extent and the site of the lesion. Weight-bearing tends to increase the severity of the disease."

Delahousse, J. & Peyrot, J. P. Hémoglobinurie mortelle observée chez un adulte atteint de drépanocytose. [**Fatal Haemoglobinuria in an Adult with Sicklaemia**] *Bull. Méd. de l'A.O.F.* Dakar. 1957, Oct.–Dec., v. 2, No. 4, 432–5.

A case in Dakar.

Nadel, J. A. & Spivack, A. P. **Surgical Management of Sickle Cell Anemia: the Use of Packed Red Blood Cell Transfusions.** *Ann. Intern. Med.* 1958, Feb., v. 48, No. 2, 399–406, 1 fig. [25 refs.]

"1. The signs and symptoms in patients with sickle cell anemia are due to the anemia plus occlusive vascular phenomena secondary to sickling of the red blood cells, and are probably caused by an inherent abnormality in the red blood cells. Decreased oxygen tension, lowering of the pH and increase in osmolarity may increase the tendency to sickling, and a vicious cycle of erythrostasis may ensue.

"2. Patients with sickle cell anemia are notably poor risks for surgery. The conditions present during surgery and in the postoperative period may precipitate sickling. By giving repeated transfusions of packed normal red blood cells, and by maintaining a normal hemoglobin, the anemia may be corrected, the bone marrow depressed, and ultimately the peripheral blood will contain predominantly normal red blood cells. In this way, it is believed that the risk of surgery may be diminished. The same procedure has been suggested for the treatment of patients with intractable leg ulcers. The possibility of considering this treatment in the last trimester of pregnancy for patients with sickle cell anemia and sickle cell variants is also mentioned."

## VENOMS AND ANTIVENENES

Condamin, M. La collection de Serpents de l'I.F.A.N. (acquisitions 1956). [**Snakes collected by the Institut Français d'Afrique Noire in 1956**] *Bull. Inst. Français d'Afrique Noire.* 1958, Jan., v. 20, No. 1, 243–62, 2 figs.

Schöttler, W. H. A. **Miscellaneous Observations on Snake Venoms and Antivenins.** *Mem. Inst. Butantan.* 1955–56, v. 27, 85–105, 1 fig. on pl. [38 refs.]

"This paper presents a collection of supplementary observations and experiments made in connection with an extensive study on *Bothrops* venoms and their antivenins published elsewhere [this *Bulletin*, 1955, v. 52, 1016].

"A unilateral eye lesion provoked by subcutaneous injection of a certain sample of *Bothrops jararacyssu* venom in mice is described.

"The severity of the local reactions elicited by subcutaneous venom administration depends on the dose and not on the general toxicity of a venom. They are neutralized to a certain degree by species- and genus-specific antivenins. Local activity and total toxicity are neutralized at different rates. The significance of local damage in snake poisoning is amply discussed.

"Survival times of mice after intravenous and subcutaneous inoculations of lethal venom doses with and without addition of antivenin are reported.

"No congruence between in vivo titration and flocculation of antivenin was observed.

"The order of toxicity of the venoms established by intravenous assay is generally reversed in subcutaneous determinations, which results in different subcutaneous : intravenous indices for the various venom species of the same snake genus. As an explanation of this phenomenon, the possibility of a dual mechanism of death by venom is discussed.

"Under the conditions of the experiment, no influence of hyaluronidase on the subcutaneous toxicity of venom was detected."

Grasset, E. **Survey of Assay Methods of Antivenins: Immunological Factors influencing Antivenin Standardization.** *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 1, 79–122. [82 refs.]

The author has written a very comprehensive review of the present situation regarding the production and standardization of antivenenes. In an attempt to initiate rational international standardization of sera, he issued to institutes manufacturing antivenene a questionnaire asking for information on the following points: the venoms used, the methods

of titration (monovalent and group sera), the nature of the antivenene produced for therapy and its dosage. The replies (from 22 institutes) are examined in the text of his article, in which he reviews the production of antivenenes against European vipers, African and South-East Asian vipers and cobras, North and South American vipers and Australian elapines.

Immunological factors affecting regional and international standardization of antivenenes are also considered, including the nature of the venoms used as antigens, their fractionation and their biological variations.

In view of the great variety in the constitution of venoms, the author recommends (i) the use of monovalent standard sera against homologous " test " venoms of high activity and stability; and (ii) the establishment, on a regional basis, of standard antivenenes corresponding to groups of snakes characterized by venoms of common or closely related antigenic constitution.

A table admirably summarizes the problem.

*Geographical Distribution of Snakes whose Antigenic Constitution influences the Establishment of Standard Venoms and Antivenenes*

| Geographical Distribution | Type of Venomous Snakes | | |
|---|---|---|---|
| | Viperidae | Crotalidae | Elapidae |
| Europe | *V. aspis*<br>*V. ammodytes* | | |
| Africa | | | |
| northern | *V. lebetina*<br>*C. cornutus*<br>*E. carinatus* | | *N. naja* |
| equatorial | *B. gabonica* | | |
| southern | *B. arietans* | | *N. flava* |
| Asia | | | |
| India and Middle East | *V. russelli*<br>*E. carinatus* | | *N. naja*<br>*B. coeruleus* |
| Malaya (South-east) | *Ancistrodon* | | |
| Americas | | | |
| (north and south) | | *C. terrificus terrificus*<br>*B. araraca* | |
| (south) | | | *M. frontalis* |
| Australia | | | *N. scutatus* |

As preliminary steps towards the establishment of " standard " antivenenes he proposes:

" (1) Adoption of an homologous *' standard ' test venom* by the regional institutes engaged in the production of the respective type of serum.

" (2) Selection of a suitable homologous, monovalent antivenin to be eventually adopted as *standard serum* according to the following procedure:

" Determination of the neutralization potency of the serum by an adequate assay method, such as the multiple level titration method, or by using an adequate single-level method. This will permit a provisional expression of the neutralization potency of the serum, in terms of mg of dried homologous venom or in multiples of the CLD per ml of the serum, and will serve as criterion for appreciating its suitability as a standard antivenin.

" (3) Adoption of a convenient *antitoxic unit* chosen so that it will meet the biological and technical assay requirements. This unit might be related to a basic method of expressing activity in weight (mg) of dried venom, such that 0·1 ml or 1 ml would neutralize, for example, 5 or 10 CLD of the homologous standard-venom.

" By making use of these principles it would be possible to determine the potency of the neutralizing antitoxic activity of monovalent or polyvalent commercial sera in relation to such a standard serum and in terms of the antitoxic unit adopted for expressing its neutralizing potency."

[This splendid review, by an author whose untimely death is so much regretted, is one of the most important and informative written on the subject for a decade. It should be read with great care by everyone concerned with the problems of envenomization, whether arising from snakes, lizards, scorpions, fish, spiders or jelly fish.] *B. G. Maegraith*

## ERRATUM

It has been pointed out that the last part of the second sentence of the abstract of the paper by H. A. Reid & K. J. Lim, entitled " Sea-Snake Bite. A Survey of Fishing Villages in North-West Malaya " in this *Bulletin*, 1958, v. 55, 314, is somewhat ambiguous. The 10% quoted refers to the population of the area surveyed and not to the incidence of sea-snake bites. The incidence of bites was, in fact, some 1% of the population at risk.

Bücherl, W. & Pucca, Nicolina. Escorpiões e escorpionismo no Brasil. III. Titulação, por meio de camundongos, das peçonhas de *Tityus costatus* (Karsch), *Tityus trivittatus* Kraepelin, 1898 e *Bothriurus bonariensis* (Koch), 1842. [**Scorpions and their Venoms in Brazil. III. Testing in Mice of the Venoms of** *Tityus costatus*, *T. trivittatus* **and** *Bothriurus bonariensis*] *Mem. Inst. Butantan.* 1955–56, v. 27, 41–50.

The English summary appended to the paper is as follows:—

" The dried venoms, obtained from the three Brazilian scorpion species, *Bothriurus bonariensis* (*B. magalhaensi* seems to be synonymic), *Tityus costatus* and *T. trivittatus*, by the ' electric shock method ', were tested on mice. The LD 50% is established and the results are compared with the *T. serrulatus* and *T. bahiensis* venoms.

"Only the venom of the rarer species, *Tityus trivittatus*, seems to be as active as the *serrulatus* or *bahiensis* venoms, so as to call, in severe cases, for serum therapy with the antiscorpionic serum from Butantan.

"The amounts of dry venoms from these Brazilian scorpions are given and the symptomatology of the intoxication of mice is also described."

Bücherl, W. Escorpiões e escorpionismo no Brasil. V. Observações sôbre o aparelho reprodutor masculino e o acasalamento de *Tityus trivittatus* e *Tityus bahiensis*. [**Scorpions and their Venoms in Brazil. V. Observations on the Male Reproductive System and on Mating in** *Tityus trivittatus* **and** *T. bahiensis*] *Mem. Inst. Butantan.* 1955–56, v. 27, 121–55, 14 figs. [13 refs.] English summary.

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## TOXOPLASMOSIS

Pope, J. H.; Derrick, E. H.; Cook, I.; Bicks, V. A. *Toxoplasma* **in Queensland. I. Observations on a Strain of** *Toxoplasma gondii* **isolated from a Bandicoot,** *Thylacis obesulus* [Pope, Derrick & Cook]. *Australian J. Exper. Biol. & Med. Sci.* 1957, Oct., v. 35, Pt. 5, 467–79, 8 figs. [15 refs.] **II. Natural Infections in Bandicoots and Rats** [Pope, Bicks & Cook]. *Ibid.*, 481–90, 2 figs.

I. This paper describes the isolation of *Toxoplasma* from a bandicoot, *Thylacis obesulus*, in Brisbane, Australia. The strain of parasite was at first of negligible virulence for mice, but after 64 intraperitoneal passages the virulence increased to give 100% mortality in the mice after the 85th passage.

*Toxoplasma* has been described by other authors in a number of different marsupials, including the kangaroo, wallaby [this *Bulletin*, 1951, v. 48, 1048], and the wombat. This is the first occasion on which this ubiquitous parasite has been isolated from the bandicoot.

II. After the above-mentioned isolation of *Toxoplasma* from a single bandicoot, the authors carried out a more complete investigation on the incidence of the organism in this animal as well as in small numbers of other species. In all, 17 isolations were made from 43 *Thylacis obesulus*; 3 from 6 *Perameles nasuta*; 2 from 12 *Rattus assimilis*; 1 from 15 *Rattus norvegicus*; none from 7 *Rattus rattus*. Isolation was made by inoculation of triturated brain or pooled viscera from these animals into laboratory mice. *Toxoplasma* was isolated in 3 areas in Queensland, Brisbane, Mt. Glorious and Innisfail.

The virulence of all the strains was very low in mice and guineapigs; complement-fixing antibodies were demonstrable in almost all the

infected wild animals, but rarely in those in which parasites could not be demonstrated.

*Toxoplasma* could not be isolated from fleas, ticks, mites, lice or helminths taken from infected and uninfected wild animals: these ecto- and endo-parasites were triturated and inoculated into mice.

The authors conclude that the bandicoot may be an important reservoir of *Toxoplasma* in Queensland. They also point out, however, that these animals have little direct contact with man but that dogs and cats possibly become infected from them. *R. Lainson*

Hook, W. A. & Faber, J. E., Jr. **Fractionation Studies on the Antigenic Nature of** *Toxoplasma gondii*. *Exper. Parasit.* New York. 1957, Sept., v. 6, No. 5, 449–58, 2 figs.

This paper describes attempts to fractionate suspensions of *Toxoplasma* into protein and carbohydrate components and to investigate their antigenic activity *in vitro* and *in vivo*. The RH strain of *Toxoplasma* was used throughout the work and the suspensions of parasites were obtained from the peritoneal exudates of infected mice.

The toxoplasms and accompanying cellular material were washed twice in 0·85% saline and re-suspended to original exudate volume. This was then freeze-dried and stored at −20°C. until used.

The protein component of this material was extracted by ammonium sulphate precipitation methods: the carbohydrate fraction by extraction with trichloroacetic acid and precipitation with cold ethanol. In both cases the toxoplasms were fragmented by sonic vibrations at a frequency of 9 kc for 45 minutes.

The protein material obtained was found to be capable of neutralizing dye-test antibodies, acting as a complement-fixing antigen, and producing both complement-fixing and dye-test antibodies when inoculated into guineapigs. The carbohydrate fraction, however, showed no antigenic activity in relation to the complement-fixation reaction or the dye test. The authors conclude, therefore, that both dye-test and complement-fixing antigenicity are related to the protein fraction of the toxoplasms. *R. Lainson*

Westphal, A., Bimmer, Edith & Palm, Gerda. Über die Wirkung verschiedener Ionen auf die Titerhöhe des *Toxoplasma*-Serofarbtestes. [**The Effect of Different Ions on the Titre of the** *Toxoplasma* **Dye-Test**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, No. 4, 520–31. [14 refs.]

The addition of an isotonic solution of $Na_3PO_4$ to mouse peritoneal exudate made all sera containing cytoplasm-modifying antibody for toxoplasms give a negative dye test. The addition of sodium citrate, NaCl, $NaH_2PO_4$ and $KH_2PO_4$ caused the results to vary. In some cases poor exudates might be converted into good ones and reactivity of a good one

might be diminished. By adjustment of the ionic concentration it was thus found possible to vary the titre of a serum at will.

*I. A. B. Cathie*

JOSEPH, R., DESMONTS, G., JOB, J. C. & COUVREUR, J. Adénite mésenterique, localisation initiale probable d'une toxoplasmose acquise. [**Mesenteric Adenitis, Probable Localization of Acquired Toxoplasmosis**] *Arch. Françaises de Pédiatrie.* 1957, v. 14, No. 4, 405–8.

A girl of 6 had 2 months mild fever and mesenteric adenitis. Laparotomy was then performed. The appendix was normal but the mesenteric glands were greatly enlarged. None was removed. On the day of operation she developed a high fever which persisted for 10 days, followed by a sub-febrile state lasting 2 months. During this time her cervical, axillary and retrocrural glands enlarged. The Paul-Bunnell reaction was negative, but the complement-fixation titre for toxoplasmosis was positive to a titre of 1 in 120 and the dye test to a titre of 1 in 5,000 to 1 in 10,000. Toxoplasms were isolated by mouse inoculation from an axillary gland removed 3 months after the laparotomy. While not proving beyond doubt that the mesenteric adenitis was due to toxoplasmosis, this strongly suggested it. A similar course of events was found in guineapigs fed with *Toxoplasma* cysts. The parasite was localized in the mesenteric glands before dissemination in other organs.

[It seems unlikely that all clinical manifestations of toxoplasmosis have been recognized. Mesenteric adenitis may well be one. REID and MANNING (this *Bulletin*, 1957, v. 54, 753) found symptoms attributable to mesenteric adenitis in 3 of their patients and the abstracter (unpublished) found very high antibody titres in a boy who had suffered from mesenteric adenitis for 2½ years. Toxoplasmosis is not likely to be a common cause, for the present authors failed to isolate toxoplasms from mesenteric glands of 22 other children, 2 of whom gave serological reactions indicating recent *Toxoplasma* infection.] *C. P. Beattie*

DE LAET, H. A. La toxoplasmose oculaire. [**Ocular Toxoplasmosis**] *Bruxelles-Méd.* 1958, Mar. 16, v. 38, No. 11, 434–6.

A short general account for physicians.

KAYHOE, D. E., JACOBS, L., BEYE, H. K. & MCCULLOUGH, N. B. **Acquired Toxoplasmosis. Observations on Two Parasitologically Proved Cases treated with Pyrimethamine and Triple Sulfonamides.** *New England J. of Med.* 1957, Dec. 26, v. 257, No. 26, 1247–54, 7 figs. [41 refs.]

The authors describe the progress of 2 cases of acquired toxoplasmosis treated with pyrimethamine (Daraprim) and triple sulphonamides (sulphadiazine, sulphamerazine and sulphamethazine).

The first infection occurred in a worker in a toxoplasmosis laboratory who scraped his finger with a needle during experimental inoculation of animals with *Toxoplasma gondii*. He was admitted to hospital 9 days later with fever, headache, myalgia and enlarged glands in the neck and one axilla. On examination the white count was 5,800 cells per cmm. with 83% neutrophils. The complement-fixation and dye tests for toxoplasmosis were negative. However, mice injected with heparinized blood developed toxoplasmosis. In a few days the cervical and inguinal glands were also enlarged and petechiae developed on the chest. The cerebrospinal fluid was normal. On the 15th day the axillary gland was removed and showed reticulum hyperplasia. Mice injected with an emulsion of gland tissue all developed toxoplasmosis. No physical signs were found in the lungs, but some infiltration was observed for a short period in the right costophrenic angle.

The dye test became positive for the first time 11 days after exposure. The complement-fixation and haemagglutination tests became positive noticeably later than the dye test.

Treatment was begun on the 15th day: pyrimethamine, 50 mgm., followed by 25 mgm. in 6 hours and 25 mgm. daily for 20 days; triple sulphonamides: 1·0 gm. every 4 hours, the blood level being maintained at 6·9 to 8·6 mgm./100 ml.

The patient was afebrile in 36 hours, and the glands subsided by the fifth day.

He was discharged a week after the end of treatment. Two months later he developed sore throat and enlarged cervical and inguinal glands. Biopsy of the latter showed some reticulum hyperplasia; inoculation of mice was unsuccessful. He recovered without treatment and remained well for a year afterwards.

The second case was that of a middle-aged woman with thyrotoxicosis who was pecked by a parakeet 3 months before the onset of toxoplasmosis. She developed numbness and tingling in the fingers of both hands, and, later, photophobia and blurring of vision in the left eye. Fever with cervical, inguinal and axillary lymphadenopathy followed. The white cell count at this stage was 11,000 per cmm., 64% lymphocytes, all appearing immature. The Paul-Bunnell test was negative. The dye test was 1:262,000, and *T. gondii* was recovered from mice injected with material from an enlarged axillary gland (reticulum-cell hyperplasia) and from a node in the gastrocnemius muscle. Examination of the eye showed normal pupils, left lateral nystagmus and haziness of the left optic disc. There was a perimacular retinal lesion consisting of a group of yellow-white raised nodules; there were no haemorrhages but the vitreous was hazy. The cerebrospinal fluid contained some lymphocytes and the protein was raised; the pressure was normal. The dye test on the cerebrospinal fluid was positive at 1:128; the corresponding serum test was 1:65,000.

Treatment was as follows for 30 days: pyrimethamine 50 mgm. for

2 days, then 25 mgm. daily for 28 days; triple sulphonamides 0·5 gm. 4 times a day, increasing after a short period of intolerance to 1·0 gm. 4 times a day.

The response to treatment was dramatic. 5 days after the end of treatment a small inguinal gland was removed. Tissue from this gland infected mice with *T. gondii*. Several months later *Toxoplasma* was again recovered from an enlarged gland, in the femoral region. At this time there were apparently no other clinical signs.

This case is particularly interesting since ocular toxoplasmosis is usually associated with low antibody titre and high dermal sensitivity to toxoplasmic antigen. (In both these cases the dermal test remained negative over more than 60 weeks despite very high dye-test titres.)

In this patient the eye lesion developed in the acute or subacute stage when there was exceptionally high antibody title. The authors suggest that the retinal damage must have been due to proliferating parasites.

The possible relation between toxoplasmosis and thyroid disease is considered in a very interesting discussion. The efficacy of pyrimethamine [presumably as a folic acid antagonist] and the synergic effect of sulphonamides is confirmed in these cases, and reference is made to the potential toxicity of pyrimethamine. The recovery of parasites from tissue long after treatment suggests the therapy is suppressive rather than curative. *B. G. Maegraith*

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## TROPICAL OPHTHALMOLOGY

Crawford, H. E. **Crown Flower Keratoconjunctivitis.** *Hawaii Med. J.* 1958, Jan.–Feb., v. 17, No. 3, 244–5.

"Three cases are reported of a distinctive type of keratitis caused by the juice of the crown flower. The prognosis appears to be excellent and the patient needs to be reassured because he is disturbed about the blurring of vision. Treatment is directed toward the relief of pain."

[See this *Bulletin*, 1949, v. 46, 1177.]

Vola, J. Etablissement de l'index trachomateux dans les écoles primaires de Saint-Louis-du-Sénégal. (Notes cliniques et épidémiologiques.) [**Trachoma Index in Primary Schoolchildren in Saint-Louis-du-Senegal, French West Africa**] *Bull. Méd. de l'A.O.F.* Dakar. 1957, Oct.–Dec., v. 2, No. 4, 425–31.

The English summary appended to the paper is as follows:—

"Author has determined trachomatous index on a selection of 3,143 pupils coming from different primary schools of Saint-Louis of Senegal (F.W.A.). The average index is of 18·32% for the whole of the European and African pupils and of 20·1% for African pupils only.

"Variations are important according to quarter of the town, and change from 10% to 41%. Increasing indexes are corresponding to slums.

"After a short enumeration of pollution and dissemination causes, which remain classic, author notes important number of cases of trachoma I discovered. This stage without clinical signs, gives place to late complications and makes trachoma a most important social disease in Africa."

DEL VECCHIO, G. & PEDUTO, G. Cenni epidemiologici ed organizzativi sulla lotta contro il tracoma in Italia con particolare riferimento al periodo post-bellico. [**Epidemiological and Administrative Observations on the Control of Trachoma in Italy, with Special Reference to the Post-War Period**] *Ann. d. San. Pubblica.* Rome. 1957, Nov.–Dec., v. 18, No. 6, 1365–1408, 20 figs. English summary.

CHAMS, G. & SADOUGHI, G. Manifestations oculaires de la lèpre. [**Ocular Manifestations of Leprosy**] *Acta Med. Iranica.* 1957, Jan., v. 1, No. 2, 169–83, 16 coloured figs. on 8 pls. [25 refs.]

The authors describe their observations concerning the ocular manifestations of leprosy. It is a good account but contains little new matter. The paper is illustrated by several good coloured photographs. Eight case-histories are given. *D. P. Choyce*

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## MISCELLANEOUS DISEASES

WILKINSON, J. **The Influence of Heredity and Environment upon Disease amongst the Kikuyu People.** *East African Med. J.* 1957, Dec., v. 34, No. 12, 627–42. [18 refs.]

Examination of lists of those diseases which are thought to be more or less common among the Kikuyu, a Bantu people in Kenya, than among Europeans, gives little ground for the suggestion that genetic influences are as potent as environmental factors in determination of the disease pattern. Almost all the specific congenital defects which occur in the European have also been seen in the African, but it is perhaps difficult to explain the frequency of some syndromes such as Kaposi's disease [a nodular skin condition liable to become sarcomatous], onyalai [a form of thrombopenic purpura] and the fibroplastic disorders on a purely environmental basis. However, the relative frequency of the great majority of diseases can best be explained on environmental grounds, and even some of those for which a genetic explanation might first be

given. For instance, the common liver damage due to protein malnutrition among Kikuyu causes impaired hormone detoxification and hence results in the occurrence of features such as gynaecomastia and possibly inguinal hernia and primary liver carcinoma. The nature of environmental factors, including characteristics of housing and climate, which might have a bearing on health are examined in some detail and it is clear that many of them influence the occurrence of disease, though present knowledge is inadequate to allow any final evaluation of the relative influence of heredity and environment. *G. Macdonald*

Verwilghen, A. M. Contribution à l'étude de l'ulcère gastro-duodénal au Kwango. [**Study of Peptic Ulceration in Kwango, Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1957, Oct. 31, v. 37, No. 5, 757–72, 1 diagram. [11 refs.]

The English summary appended to the paper is as follows:—

"The gastroduodenal ulcer, considered even these last years as rather rare in the Belgian Congo, in fact is to be found amongst the natives of the Kwango just as anywhere else. A statistic of 167 operated cases indicates a rather high frequency of acute and subacute cases, in regard with the chronic cases. One third were women.

"A serious lack of proteins and vitamin B, as observed in this country, constitutes probably one of the etiological factors of the gastroduodenal ulcer in the Kwango: for it cannot be due to a hurried and restless way of life in a country without any trace of nervous tension."

[See this *Bulletin*, 1955, v. 52, 407 *ter.*]

la Brooy, E. B. **Endomyocardial Fibrosis.** *Proc. Alumni Ass., Malaya.* 1957, Dec., v. 10, No. 4, 303–12, 10 figs. [14 refs.]

"1. Two cases of endomyocardial fibrosis in Malaya are reported. Reference is made to other cases of a similar nature reported in this country.

"2. The relationship between endomyocardial fibrosis and endocardial fibroelastosis is discussed very briefly.

"3. The view is presented that one of the cases might be a very early stage of endomyocardial fibrosis."

[See this *Bulletin*, 1957, v. 54, 488.]

Sankale, M., le Viguelloux, J. & Rivoalen, A. Un cas de pseudo-onyalai par aplasie myélo-sanguine aiguë. [**A Case of Pseudo-Onyalai associated with Acute Aplasia of the Blood and Marrow**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 715–18.

## PARASITOLOGY: GENERAL

ELSDON-DEW, R. & HORNER, R. **The Incidence of Intestinal Parasites in Durban Factory Workers.** *South African Med. J.* 1958, Feb. 8, v. 32, No. 6, 145–6, 1 fig.

The University of Natal Amoebiasis Research Unit compares results of surveys of intestinal parasite incidence in three groups of Africans, factory workers mainly housed in barracks, and inhabitants of Cato Manor, "a notorious slum", and of Chesterville, "a sub-economic housing scheme" [this *Bulletin*, 1954, v. 51, 225]. Consolidated results were as follows:—

| | Percentage infected | | | | |
|---|---|---|---|---|---|
| | *Factory* | *Cato Manor* | *P* | *Chesterville* | *P* |
| All metazoa | 65 | 78·5 | <0·01 | 56·2 | <0·01 |
| All protozoa | 48·6 | 68·3 | <0·01 | 67·5 | <0·01 |
| | Species per patient (%) | | | | |
| Protozoa | 0·64 | 1·23 | | 1·12 | |
| Metazoa | 0·88 | 1·33 | | 0·79 | |
| Total parasites | 1·52 | 2·56 | | 1·91 | |

Protozoal infection was very much more intense in slum conditions. *E. histolytica* was found in the following percentages: Factory, 7·9; Cato Manor, 17·4; Chesterville, 15·2. On the other hand incidence of helminthic infection among the factory workers, though lower than that at Cato Manor, was actually higher than at Chesterville. These are puzzling results: the only factor which, it is thought, might explain them is that all of the factory workers received at least one meal a day provided by the factory at a nominal charge. *B. B. Waddy*

MOSER, Lis. O etiologii śródmiąższowego plazmatycznokomórkowego zapalenia płuc u niemowląt. [**On the Aetiology of Interstitial Plasma Cell Pneumonia of Infants**] *Wiadomości Parazytologiczne*. Warsaw. 1957, v. 3, No. 6, 565–74. English summary.

The author considers that interstitial plasma cell pneumonia of infants is a virus infection, and that acidophil granules which can be found in the lungs at autopsy represent the infective agent. Granules isolated from a suspension of lung tissue and used as antigen fixed complement with sera from 25 children suffering from the disease. In further tests with 2,331 sera from 1,704 persons, positive results were obtained with 16·4% of 575 sera from members of hospital staffs, whereas no antibody was present in the sera of 113 normal persons. Extracts of infected lungs produced fatal illness in young rats after intranasal inoculation. The forms described as *Pneumocystis carinii* are considered to be atypical thrombocytes which have arisen as a response to a virus infection.

*D. J. Bauer*

Biagi F., F. **An Unidentified Parasite in Human Myocardium.** *Amer. J. Clin. Path.* 1957, Dec., v. 28, No. 6, 622–7, 9 figs. [12 refs.]

A man aged 72 years was operated on for lung cancer in Mexico City; he died a few weeks later and a post-mortem examination was made. In sections of the heart some curious structures were found which are described and illustrated in this paper. Pseudocysts and aggregations of free parasites were found in and among the muscle fibres, unaccompanied by any cellular reaction. The size of the pseudocysts varied from 10 to 128 $\mu$ and they were usually irregularly elongate in shape. The individual organisms were not easily seen inside the pseudocysts but their morphology was better visible when they lay free; the parasites were then observed to be long and straight with rounded ends, possessed a small central nucleus and were up to 2 × 4 $\mu$ in size.

The nature of the parasite is discussed at some length and the diagnosis of *Histoplasma*, *Trypanosoma cruzi*, *Leishmania donovani*, *Sarcocystis*, *Toxoplasma*, *Encephalitozoon*, *Besnoitia* and *Pneumocystis* is considered and rejected. [The illustrations of the " free forms " give the impression of vegetable spores, and one wonders if the pseudocysts represent the same condition; if not, the possibility of the latter being degenerating sarcocysts might be considered.] *P. C. C. Garnham*

Kaudewitz, F. Versuche mit radioaktivem Phosphor an einzelnen Zellen verschiedener Protozoenarten. [**Studies with Radioactive Phosphorus on Separate Cells of Different Protozoa**] *Arch. f. Protistenk.* 1958, v. 102, Nos. 3/4, 321–448, 46 figs. [48 refs.]

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## ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Lee, D. J., Dyce, A. L. & O'Gower, A. K. **Blood-Sucking Flies (Diptera) and Myxomatosis Transmission in a Mountain Environment in New South Wales.** *Australian J. Zool.* 1957, Dec., v. 5, No. 4, 355–401, 4 text figs. & 20 figs. on 2 pls.

Among the blood-sucking Diptera collected during this investigation in eastern New South Wales were 34 species of Culicidae, 10 species of Ceratopogonidae, 6 Simuliidae, 11 Tabanidae and 2 Leptidae. Biological notes are given on these species.

Some notes on collecting techniques are of interest to many readers of this *Bulletin*. For virus recovery from arthropod vectors it was decided that selective collecting of small numbers was more useful than indiscriminate collecting of suspects, though all methods provided valuable general biological information. The use of man as bait was the most successful, so efforts were concentrated on this method and such collections were made on all possible occasions.

Bare-legged collectors sat in groups or pairs for at least 15 minutes at various places and times; no attack was noticed for 8–10 minutes after sitting down. In the mornings the collectors would remain until the attack ceased and then move to another site. No movement was necessary in the afternoons, when a prolonged period of catching was usually recorded, or in the evenings, when the biting wave lasted for about 2 hours after 1730 hours. All families of the flies were attracted to the human bait.

Besides the human bait technique other methods employed were: collecting in natural and domestic shelters; light trapping; net sweeping; and animal bait trials. These adult collections showed that a more comprehensive picture of the biting fly complex was gained, particularly in the case of Culicidae, than that obtained from larval searching; that patterns of behaviour may be incidentally revealed, and that recently engorged specimens may be collected from man and yield information on biting habits. *H. S. Leeson*

Adam, J. P. Présence d'*Anopheles jebudensis* Froud, en Côte-d'Ivoire. Position systématique de cet anophèle. [**Presence of** *Anopheles jebudensis* **in the Ivory Coast and its Systematic Position**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 671–5, 1 fig.

Hamon, J., Taufflieb, R. & Maillot, L. Description d'*Aedes* (*Aedimorphus*) *grjebinei* sp. n. accompagnée de quelques données nouvelles sur les moustiques d'A.E.F. [**Description of** *Aëdes* (*Aëdimorphus*) *grjebinei* **and Some New Data on the Mosquitoes of French Equatorial Africa**] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 692–6, 2 figs. [15 refs.]

Hamon, J. Deux moustiques nouveaux de Côte-d'Ivoire: *Aedes* (*Aedimorphus*) *falabreguesi* sp. n., *Culex* (*Culex*) *castelli* sp. n. [**Two New Mosquitoes from the Ivory Coast:** *Aëdes* (*Aëdimorphus*) *falabreguesi* **and** *Culex* (*Culex*) *castelli*] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 685–91, 3 figs. [19 refs.]

Hamon, J., Holstein, M. & Rivola, E. Description d'un nouveau moustique du Congo Belge: *Culex* (*Neoculex*) *vinckei* sp. n. [**Description of a New Mosquito from the Belgian Congo:** *Culex* (*Neoculex*) *vinckei*] *Bull. Soc. Path. Exot.* 1957, Sept.–Oct., v. 50, No. 5, 681–5, 2 figs. [10 refs.]

Déduit, Yolande. Études sur la ponte par autogénèse des Culicides. II.—Données numériques sur l'acte de ponte chez la femelle fécondée de *Culex pipiens autogenicus* Roubaud. [**Study of Autogenetic Oviposition in Mosquitoes. II. Statistical Data relating to Oviposition in the Fertilized Female** *Culex pipiens autogenicus*] *C.R. Soc. Biol.* 1957, v. 151, No. 5, 974–7, 3 figs.

Egg development and oviposition by autogenesis are compared in fertilized and unfertilized females of *Culex pipiens autogenicus*. While dissection reveals that the numbers of eggs developed in each are the same, in fertilized females almost all eggs formed are finally expelled, 94% compared with only 68% in virgin females. As in virgin females the average number of eggs per oviposition increases with wing length.

[For Part I, see this *Bulletin*, 1956, v. 53, 377.] *R. J. Wood*

Eddy, G. W., Hopkins, T. L. & Robbins, W. E. **Resistance of** *Culex tarsalis* **Coq. to DDT in Oregon.** *J. Econom. Entom.* 1958, Feb., v. 51, No. 1, 56–8. [19 refs.]

Koshi, T. & Ranganathan, S. K. **Laboratory Variations in Mortality of the Mosquito,** *Culex fatigans* **Wied., exposed to DDT.** [Correspondence.] *Nature.* 1958, Jan. 18, v. 181, 199–200, 2 figs.

An investigation has been made of the variation in the susceptibility of adult *Culex fatigans* tested fortnightly with pp′-DDT during a period of 7 years in Kanpur, India. Both the breeding of the insects, and the assay of toxicity, were carried out in a partially conditioned room in which, while day-to-day variations in temperature and humidity were not appreciable, they varied particularly in respect of humidity at different seasons of the year: 80–90°F. and 48–92% relative humidity.

The results showed that while variation in temperature could not account for the rise and fall of the values of the LD50, humidity played a positive role. With higher humidities, particularly during the period August to October, greater values of LD50 were registered. The values were correspondingly lower in November to February when the humidity dropped.

To confirm these findings, tests were made on adult *C. fatigans* kept at the same temperature, 29 ± 1°C., but at two different controlled levels

of humidity, 49 ± 6% and 88 ± 4%. As expected, the humidity bore an inverse relation to the mortality affected.

[See also this *Bulletin*, 1956, v. 53, 976; 1957, v. 54, 632.]

*R. J. Wood*

THEVASAGAYAM, E. S. **Toxicity of some Newer Insecticides to Larvae and Pupae of *Culex fatigans* Wiedemann.** *Bull. World Health Organization.* Geneva. 1957, v. 17, No. 3, 413–37, 6 figs. [23 refs.]

Two separately maintained colonies of *Culex fatigans*, one at 88° ± 2°F. (31·1° ± 1·1°C.) and 70%–80% relative humidity, and the other at 72° ± 3°F. (22·2° ± 1·7°C.) and 45%–55% RH, were tested with DDT, dieldrin, endrin, malathion, parathion, Systox and P4. Mortality counts were made after 25 larvae or pupae had been exposed to acetone solutions of the insecticides in 25 ml. of water for 24 or 48 hours.

The order of toxicity to larvae was as follows: parathion, endrin, dieldrin, DDT, malathion, P4 and Systox. The LC50 at 24 hours varied from 0·003 p.p.m. for parathion to 0·18 for Systox. Pupae showed greater resistance than larvae; the LC50 for parathion was 0·034.

DDT, dieldrin, endrin and parathion were more toxic to larvae tested and reared at the lower temperature. The temperature after exposure to DDT altered toxicity to a greater extent than the temperature at which the larvae had been reared.

*R. J. Wood*

SHIDRAWI, G. R. **Laboratory Tests on Mosquito Tolerance to Insecticides and the Development of Resistance by *Aëdes aegypti*.** *Bull. World Health Organization.* Geneva. 1957, v. 17, No. 3, 377–411, 15 figs. [37 refs.]

When fourth stage larvae of *Culex molestus* and a susceptible strain of *Aëdes aegypti* were selected for 15 generations with DDT at the LC50 level, no appreciable decrease in susceptibility to DDT was induced. However, the selection of this strain of *A. aegypti* over the same number of generations with BHC caused a two-fold increase in resistance to this compound, which also extended to DDT and dieldrin. Selection of the same strain with dieldrin at a low mortality level over 14 generations had no appreciable effect on resistance.

When a strain of *A. aegypti* naturally 3 times resistant to DDT (Malaya strain) was selected through 8 generations this resistance was increased to 7 times its natural level.

*R. J. Wood*

See also p. 645, MATTINGLY, **Genetical Aspects of the *Aëdes aegypti* Problem. I.—Taxonomy and Bionomics.**

Abonnenc, E. & Larivière, M. Les formes larvaires de quelques Phlébotomes des régions méditerranéenne et ethiopienne. [**Larval Forms of Some *Phlebotomus* of the Mediterranean and Ethiopian Regions**] *Arch. Inst. Pasteur d'Algérie.* 1957, Dec., v. 35, No. 4, 391–403, 8 figs.

Clastrier, J. Notes sur les Ceratopogonidés. II.—Quelques *Culicoides* d'Algérie à ailes tachetées. [**Notes on Ceratopogonids. II. Some *Culicoides* of Algeria with Mottled Wings**] *Arch. Inst. Pasteur d'Algérie.* 1957, Dec., v. 35, No. 4, 404–44, 30 figs. [17 refs.]

Chang, J. T. & Wang, M. Y. **Nutritional Requirements of the Common Housefly, *Musca domestica vicina* Macq.** [Correspondence.] *Nature.* 1958, Feb. 22, v. 181, 566.

Fly eggs were sterilized by immersion in Vanderzant's solution (Vanderzant and Reiser, *J. Econom. Entom.*, 1956, v. 49, 7) and then allowed to develop singly on an artificial medium. Omission of various factors in the artificial medium showed retarded growth in the absence of ribonucleic acid, or vitamins A, C and D. This retardation was also noted in non-sterile larvae where the normal bacterial flora was present.

Casein hydrolysates were used to investigate amino-acid requirements, and the importance of tryptophan was shown. Preliminary work with amino-acid mixtures indicates similar requirements for *Drosophila melanogaster* (Hinton, *Genetics*, 1955, v. 40, 224) and *Pseudosarcophaga affinis* (House, *Canadian J. Zool.*, 1954, v. 32, 358). *E. R. Nye*

Knapp, F. W. & Knutson, H. **Reproductive Potential and Longevity of Two Relatively Isolated Field Populations of Insecticide-Susceptible House Flies.** [Abstract.] *J. Econom. Entom.* 1958, Feb., v. 51, No. 1, 43–5.

van Asperen, K. **Mode of Action of Organophosphorus Insecticides.** [Correspondence.] *Nature.* 1958, Feb. 1, v. 181, 355–6, 1 fig.

In mammals, certain organo-phosphorus poisons act by inhibition of cholinesterase (ChE). This enzyme is present in insects and is inhibited by organo-phosphorus insecticides; but it is not certain that this is the essential mode of action, because (i) it is not definitely established that acetyl-cholinesterase performs the same vital role in insects, and (ii) other esterases present in insects are known to be affected by these insecticides.

To investigate the matter, the author studied the action of O,O-dimethyl-O-2,2-dichlorvinyl phosphate (DDVP) on house-flies. Flies

intoxicated with vapour of DDVP were rapidly chilled and homogenized for measurements of the level of ChE inhibition. (An essential part of the technique was to add acetyl-choline before homogenizing, to protect the enzyme from the attack by free DDVP; *i.e.*, the uncombined excess in the tissues.) Tests were also made of the level of inhibition of another esterase found in the flies, which would split up methyl butyrate. A series of tests gave fairly consistent indications that, at the time of knockdown of flies, the inhibition of ChE in the whole flies was about 27%, in the heads (main source of ChE) about 24% and in the rest of the body, 46%. In contrast, the inhibition of the other esterase was about 83%.

In mammals, cholinesterase inhibition does not produce toxic effects until inhibition exceeds 80% (owing to a normal excess of enzyme). Therefore the above results suggest that the main action of the organophosphorus insecticides may be on the other enzyme systems rather than on ChE. *J. R. Busvine*

Schoof, H. F. & Kilpatrick, J. W. **Organic Phosphorus Compounds for the Control of Resistant House Flies in Dairy Barns.** *J. Econom. Entom.* 1958, Feb., v. 51, No. 1, 20–23, 3 figs.

"At Savannah, Georgia, in 1956, residual applications of Diazinon to dairy barns at a rate of 100 mg./sq. ft. alone or with sugar (250 mg./sq. ft.) gave 6 to 8 weeks of satisfactory control. At the rate of 20 mg./sq. ft., Diazinon without sugar failed to provide control but with sugar (50 mg./sq. ft.) produced 4 weeks of satisfactory reduction.

"A Dipterex-water solution applied at the rate of 100 mg./sq. ft. gave 3 weeks of satisfactory control compared with 8 weeks of control obtained with a Dipterex : sugar formulation (100 : 250 mg./sq. ft.).

"Parathion : DDT emulsion formulations at the rate of 10 : 200 mg./sq. ft. gave control ranging from 1 to 7 weeks. A parathion : sugar emulsion treatment at the rate of 10 : 250 mg./sq. ft. produced only 1 week of excellent control.

"A single test with an EPN : DDT suspension at a rate of 25 : 200 mg./sq. ft. gave excellent control for the entire 13-week evaluation period. Dow ET-15 emulsion applied late in the season at the rate of 200 mg./sq. ft. provided excellent control for the 9-week evaluation period."

[See this *Bulletin*, 1957, v. 54, 765.]

Oppenoorth, F. J. **A Mechanism of Resistance to Parathion in *Musca domestica* (L.).** [Correspondence.] *Nature.* 1958, Feb. 8, v. 181, 425–6, 2 figs.

Two resistant strains were investigated. One ($U_2$) had developed resistance to gamma BHC, and although it had never encountered

organo-phosphorus insecticides, it was found to have some resistance to them. The other colony (D) had developed field resistance to organo-phosphorus (in Denmark) and had been further selected by parathion in the laboratory. Contact tests (in which flies were exposed to residues of peanut oil solutions in glass jars) showed that U was roughly twice, and D roughly 7 times, as resistant as a normal colony, to both parathion and para-oxon. If the insecticides were injected into the flies, considerable (though slightly less) resistance to parathion was observed, but no resistance to para-oxon.

It was presumed that parathion in the flies is transformed to para-oxon (as in other animals) and then acts as an anti-esterase (possibly attacking acetylcholinesterase). Measurements of the para-oxon in the 3 kinds of fly (after application of parathion) showed that much more was present in normals than in $U_2$, and practically none in D. Further tests indicated that the para-oxon was detoxified in D and $U_2$. It is presumed that this detoxication can only act in low concentrations of para-oxon; that is why no resistance was seen when para-oxon itself was injected.

The resistance of $U_2$ which had not been exposed to parathion was remarkable. In a sub-colony which had been bred for some generations without selection and had lost resistance to gamma BHC, it was noted that the parathion resistance and the capacity to degrade para-oxon, were simultaneously lost. *J. R. Busvine*

Kilpatrick, J. W. & Schoof, H. F. **A Field Strain of Malathion-Resistant House Flies.** *J. Econom. Entom.* 1958, Feb., v. 51, No. 1, 18–19.

Kurtpinar, H. Anadoluda, *Argas reflexus* Fabr. (Güvercin kenesi) nin insanlarda tevlit ettiği sihhî bozukluklar üzerinde araştirmalar. [*Argas reflexus* **(Fabricius, 1794) as a Human Parasite in Turkey**] *Türk Ijiyen ve Tecrübî Biyoloji Dergisi.* Ankara. 1957, v. 17, No. 3, 237–43, 3 figs. [17 refs.]

The English summary appended to the paper is as follows:—

"1. In the two Northern Provinces of Turkey (Erzurum and Malatya) we observed severe infestations of dormitories with the pigeon tick Argas reflexus. The parasites invaded the sleeping rooms from the attic of the buildings which were for many years resting places of pigeons.

"All the specimens which were collected from the walls of the dormitories were in adult stages.

"2. From our 22 cases of tick bite, 12 persons showed severe reaction, such as pain and oedematous swelling in the place where they had been bitten, shortness of breath, palpitation, dulness, raising of temperature to 38 C and profuse perspiration, and itching."

"In majority of the cases the bites occurred chiefly on the hands and feet. In one case the bite was on penis and in the other one on chest.

"3. The control of Argas reflexus was very successful with the heavy spray of 2 per cent. Gammexane (BHC)."

GILLETT, J. D. **On the Habits and Life History of Captive Emesine Bugs (Hemiptera: Reduviidae).** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1957, Dec. 31, v. 32, Pts. 10/12, 193–5.

A species of Emesine bug, *Bagauda gilletti*, has recently been used in the Virus Research Institute, Entebbe, Uganda, in tests on the maintenance of yellow fever virus in arthropods which prey on mosquitoes. An account of these tests will be published shortly. In this paper notes are given on some habits of the bug, particularly on walking and feeding.

Adult bugs were collected from tree trunks and put into a laboratory cage at 25°C. and 70% relative humidity. At first they exhibited a nocturnal activity rhythm but lost it after a few days and wandered at all hours. They walked on their long mid- and hind-legs with their folded raptorial fore-legs held out and their very long antennae sweeping a wide area in front.

Living *Aëdes aegypti* and *A. africanus* were put into the cage and when a bug's antennae touched one of these mosquitoes the bug made any necessary positional adjustments by pivoting on its walking legs, then captured the mosquito with its raptorial legs, conveyed it to its mouth and sucked it dry in 20–40 minutes. These bugs have been kept alive for over 4 months on 2 mosquitoes a day but one bug may use up to 24 mosquitoes in a day.

Eggs hatched in 2–3 weeks. Young nymphs fed daily on 3 or 4 smaller mosquitoes (*Hodgesia cryptopus*). Fifth stage nymphs and adults responded to the larger *Aëdes*. *H. S. Leeson*

## MISCELLANEOUS PAPERS

AUDY, J. R. **Medical Ecology in relation to Geography.** *Brit. J. Clin. Practice.* 1958, Feb., v. 12, No. 2, 102–10, 6 figs. [39 refs.]

The nature of a community, urban or rural, pastoral or nomad, and the environment in which it lives, including climatic, vegetative, animal and sanitary surroundings, influence the pattern of disease in the community in the sense of altering the frequency of individual infections without necessarily determining the absolute absence or universal presence of any. This important material to the epidemiologist is difficult to describe for several reasons: uncertainty or disagreement about the

proper content, leading to multiplication of titles and definitions; the difficulties of recognition of a pattern in the environment, in the disease and in the changes in disease with the passage of time; and the difficulty of illustrating the various patterns each of which includes a number of factors. The author experiments with these; he defines and names his subject, medical ecology, and the group with which it deals, the community. He illustrates by diagram the patterns of infection found in some groups of rat and in human communities; he shows a climatogram illustrating the relationship of climate to plague. He illustrates the climatic regions of the world and, on another system, the distribution in space and time of four types of typhus and the chigoe flea. The paper is mainly intended as an experiment in illustration of these techniques, in which it succeeds, and it concludes with a useful list of references.

*G. Macdonald*

Lassance, M., Peeters, E. & Hanck, J. Tables biométriques de la population scolaire du Centre extra-coutumier de Stanleyville. [**Biometric Tables of African Schoolchildren in Stanleyville, Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1957, Oct. 31, v. 37, No. 5, 631–9.

The English summary appended to the paper is as follows:—

"Authors present biometrical tables specifically adapted to native children of Stanleyville. They are intended to be used instead of the Belgian children standards."

Coles, Ruth M. **The Relation of Height and Body Weight of Uganda African Patients.** *East African Med. J.* 1957, Dec., v. 34, No. 12, 619–26, 1 fig. [14 refs.]

This survey has been carried out on East Africans attending the out-patient department of Mulago Hospital, Uganda, where the dominating tribal group is the Baganda. Reviewing the very scanty earlier work on the same subject, the author remarks that the mean height of adult male Baganda, recorded by Oschinsky (1952, *The Racial Affinity of the Baganda and Other Bantu Tribes of British East Africa*, Cambridge: Heffer) as 165·96 ± 6·23 cm. shows no increase over that recorded by Roscoe (1911, *The Baganda*, Cambridge, London), whose figure was 166·30 cm. The mean height of 90 Baganda females was found to be 155·8 ± 5 cm. (61·32 ± 1·94 in.).

In the population sampled, the height range of 713 adult males lay between 4 ft. 11 in. and 6 ft. 6 in., but individuals below 5 ft. 2 in. or above 6 ft. were very rare and were excluded from the calculation of the mean. Of the remaining 675, one-third fell into the range 5 ft. 6 in. to 5 ft. 8 in., and weighed about 125 lb. There was a linear relationship

between increasing height and increasing weight, the Uganda African showing an average increase of 1·7 kgm. for each 1 in. increment in height. This is somewhat lower than the United States figure recorded by the American Medico-Actuarial Mortality Investigation, which is 1·4–1·8 kgm. per 1 inch increment in height. The Uganda African is thus, height for height, somewhat lighter than the European or United States male.

There are moderate variations in stature between tribes, which are recorded in a table. A notable difference between European and African males is the tendency for the latter to diminish in mean weight with increasing age, as opposed to the European, in whom the converse obtains. *J. H. Walters*

EDOZIEN, J. C. **The Serum Proteins of Healthy Adult Nigerians.** *J. Clin. Path.* 1957, Aug., v. 10, No. 3, 276–9. [14 refs.]

"The serum proteins of healthy adult Nigerians have been studied by chemical fractionation and zone electrophoresis on filter paper.

"The serum of healthy adult Nigerians contains a lower concentration of albumin and a higher concentration of globulin than the serum of adult Europeans. This higher concentration of globulins in the serum of Nigerians is due to a high content of $\gamma$ globulin.

"It is concluded that this $\gamma$-globulinaemia is not related to liver disease or diet but may be genetically determined."

[This is a bold conclusion. Is it not possible that this gamma-globulinaemia is more related to a pattern of immunity than to a pattern of genetics ?] *Cicely D. Williams*

DE SMET, M. & WILLEMAERS, P. Contribution à l'étude du volume plasmatique, de l'espace extracellulaire et de certaines valeurs électrolytiques chez le Congolais de la cuvette. [**Study of Plasma Volume, Extracellular Space and Certain Electrolytic Values in Africans of the Congo Basin Area**] *Ann. Soc. Belge de Méd. Trop.* 1957, Oct. 31, v. 37, No. 5, 593–621. [Numerous refs.]

The English summary appended to the paper is as follows:—

"1) The Congolese living in unaccustomed surroundings have a water balance which closely approximates that of the European living in temperate countries. Their salt balance is not comparable to that of the European in temperate regions.

"2) Broca's formula governing the correlation between height and weight is not applicable to the Congolese. In this light, the male and female populations are different—the latter being more homogenous.

"3) The plasmatic, blood, and cellular volumes, expressed in kg of theoretical weight, approach the values cited by American authors. The

calculation of deficits gives important deductions for the reanimation of the patient. The theoretical results, obtained by statistical study, are valuable for clinical interpretation.

" 4) The thiocyanate diffusion space reveals the early changes of extracellular water and allows the surveillance of the effects of the rehydration and the recovery of the operated patient.

" 5) The serum concentration of each ion has only a relative value. The calculation of the serum and extracellular stock of each ion is indispensable.

" 6) Serum conductivometry, theoretically permitting a rapid revelation of the intracellular osmotic state, is shown to be impractical for the evaluation of early troubles of the intracellular osmotic state."

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## REPORTS AND SURVEYS

COLONIAL OFFICE. **Colonial Research 1956–1957. Colonial Medical Research Committee. Twelfth Annual Report (1956–1957)** [HIMSWORTH, H. P., Chairman] (pp. 146–96). Cmnd. 321. 322 pp. 1957, Nov. London: H.M. Stationery Office. [11s.]

The Committee records the discontinuation of the hot climate physiological researches in Nigeria and, owing to political trouble, research on trachoma in Jordan. These reductions in activity are, however, more than matched by extension of other projects; research on tuberculosis both in Ghana and in the form of chemotherapeutic trials in East Africa has been much extended; in leprosy, the formation of a sub-committee to coordinate activities marks a definite step forward. There has been an extension of work on filariasis and in some cases from laboratory work to the initiation of pilot measures; a notable innovation is the making of a modest block grant to each of the regional organizations in East Africa, West Africa and the Caribbean from which they can finance research themselves without the cumbersome mechanism of agreement between governments locally and in Britain. It is hoped that this will be a major step towards the ultimate independence of the organizations concerned.

The review of work in progress, including mention of all schemes that are aided by the committee and also of work by organizations associated though not aided by it, covers many aspects of tropical medicine and makes reference to much work which is reported elsewhere in scientific papers and annual reports. Prominent among the activities are physiological and nutritional research through the agency of special units in Uganda, Tanganyika, Jamaica and Nigeria, all of which have some primary interest in the study of protein malnutrition though other aspects

are not neglected. Helminthiasis continues to receive considerable attention; the previous work on loiasis has been extended, the scale of work on schistosomiasis in East Africa has been enlarged, and other workers from U.K. and in Malaya have made considerable additions to our knowledge of filariasis in Malaya. The Committee's direct interest in malaria research is mainly through the East African Malaria Institute [see p. 622] though the report includes statements of work carried out by the Nigerian Malaria Service and in the Liverpool School of Tropical Medicine. Work on virus diseases continues in the Entebbe laboratory, in the Trinidad Regional Virus Laboratory and in the Malayan Institute of Medical Research. In all these cases the chief interest appears to have lain in the mosquito-borne viruses, one aspect or another of which is studied in each. Other subjects on which work is described include the tick which carries relapsing fever, the identification of the blood meals of insects, and the biology of sandflies in East Africa.

The report concludes with a brief statement of research work undertaken and financed in some colonial territories. It gives an excellent perspective of the scale and quality of research which is now being encouraged throughout colonial territories and largely through the agency of this committee. *G. Macdonald*

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## BOOK REVIEW

Breed, R. S., Murray, E. G. D. & Smith, N. R. **Bergey's Manual of Determinative Bacteriology.** 7th Edition. pp. xviii + 1094. 1957. London: Baillière, Tindall & Cox, Ltd., 7 & 8, Henrietta Street, W.C.2. [£6.]

[This review appears also in *Bull. Hyg.*, 1958, v. 33, 421.]

Those who have access to the successive editions of the Bergey manual know how much better is each new edition; the latest (7th) edition is no exception. It is smaller than the 6th edition [this *Bulletin*, 1949, v. 46, 188] by about 400 pages and is set out more clearly, particularly in the index. The last, however, is not a comprehensive index of specific names, as was that of the 6th edition, the reason being that many names used only as synonyms are not now given in the Bergey manual. All these names, with references, are to be included in another volume to be called the *Index Bergeyana*. Space has been saved by deleting the early schemes of classification and the extracts from the Botanical Code of Nomenclature, neither of which would often be consulted by users of the manual. This edition of the manual is the last work of, and a fitting memorial to, the late R. S. Breed, who was assisted by nearly a hundred contributors, each an authority on his or her particular section. Proof-

reading and final revision were under the direction of R. E. BUCHANAN, who is obviously responsible for certain changes in nomenclature.

The present edition will be more useful to those attempting to identify a culture because most of the species are described more fully than in earlier editions, but a good working knowledge of bacteriology, sufficient to put an organism into a genus, will still be a great advantage. For those who cannot allocate an organism to a genus, the dichotomous key prepared by V. B. D. SKERMAN will be found helpful.

At genus level the diagnostic keys are arranged in step-like progression, sometimes with 1, sometimes with 2 characters for each step. Unfortunately it is still necessary to know the source of a culture if you are to attempt to identify a species of *Pseudomonas* (soil and fresh water; sea water and brine; plant pathogen) or *Corynebacterium* (vertebrate; invertebrate; plant), and there are still too many species differentiations made on characters such as pathogenicity. Among the bacteria of medical interest the genus *Malleomyces* has disappeared; the glanders bacillus is now allocated to *Actinobacillus*, and Whitmore's bacillus to *Pseudomonas*. The species of *Mycobacterium* have been the subject of intensive work within the last few years and this is reflected in a thorough revision of this section. The genus *Clostridium* has been expanded further and one wonders how many of the 93 species are justified. *Staphylococcus* has reappeared, but readers will search the index in vain for *Streptococcus viridans*. Some branches of medical bacteriology, *e.g.*, the enterobacteria, are now so specialized that the manual cannot deal with them adequately. Those interested in this group will deplore the decision to retain *Paracolobactrum* for the paracolons, a decision which results in the separation of the Arizona group from *Salmonella* by about 20 pages. The nomenclature used for the non-mannitol-fermenting *Shigella* serotypes will only add to the confusion existing, but some amend has been made by publishing as a table the internationally accepted scheme and various synonyms.

The manual will still bring joy to the splitter, and despair to the heart of the clumper. *S. T. Cowan*

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